

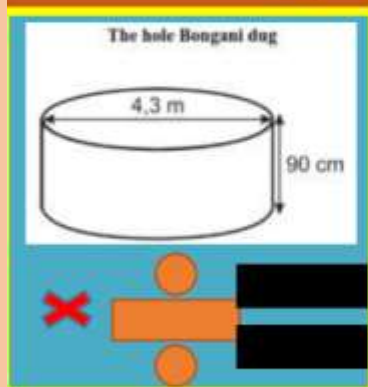


# MATHSCIECAT TUTORING

GRADE 12

WORK BOOK (CAPS)

## MATHEMATICAL LITERACY 2019



MARTIN BONGERS

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## BASIC SKILLS

### Negative numbers

- We use negative numbers mostly to represent temperatures in our everyday life. They used to show degrees of coldness. The colder it becomes, the lower the temperature is. The freezing temperature of water is  $0^{\circ}\text{C}$  at sea level. Anything colder than  $0^{\circ}\text{C}$  is indicated as a minus (negative) temperature.
- We use negative numbers in business  
Examples:
- A bank balance is positive if there is money in the account. However, if a person overdraws an account (draws more money than there is in the account), the balance will be negative.
- Be careful when reading financial statements. Sometimes a negative sign is used to indicate that a value has been paid and the amount must be deducted from the balance. On the other statements, a negative sign indicates that money has not been paid yet.
- Most businesses use the term **debit** and **credit** to avoid confusion. Debit (Dr) on a financial statement shows that money is still outstanding (it must be paid). Credit (Cr) indicates that money has been paid.

### Examples

1. In Japan a daytime temperature of  $1^{\circ}\text{C}$  can drop by 6 degrees during the night. What will the temperature be then?
2. James enters a lift. He gets out on the eleventh floor,, but realises that it is the wrong floor. He then goes four floors down and three floors up. At which floor is he?

#### Answers

1  $1^{\circ}\text{C} - 6^{\circ}\text{C} = -5^{\circ}\text{C}$

2  $11 - 4 + 3 = 10$

He is on the tenth floor.

### Rounding off

- We use whole numbers, such as 5, 27,200, as well as fractions. 1, 2 metres to record a child's height.
- It is important to know how and when to round off numbers.

#### Example

- When baking a cake, it is not practical to measure 249, 89ml of cake flour. A chef will *round up* such a measure to **250 ml** so that it is easy to measure an amount of flour using a measuring cup.

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- Sets of measuring spoons include spoons that measure 1 ml; 2,5 ml; 12,5 ml; 25 ml; 50 ml; 100 ml and 250 ml. Amounts needed for recipes are rounded off so that it is easy to use these measuring spoons. For example, if the quantity of baking powder needed for a recipe is 20, 25 ml, the chef will round the quantity to 5 ml so that it is easy to measure off the amount when cooking.
- When working with money, we usually round off to two decimal places.
- Always keep in common sense and logic in mind when rounding off values.

#### Examples

R 17, 3742 = R17, 37

R26 , 467 = R26, 47.

- When rounding off to one decimal place, look at the digit in the second decimal place. If it is equal or greater than 5, the first decimal value increases by 1. If it is smaller than 5, the first digit remains unchanged.

Example: we round off 3,256 to 3,3 and 2,236 to 2,2.

When rounding off to two decimal places look at the third decimal place and apply the principle you applied when rounding off to one decimal place.

#### Examples, rounding off to:

- i. Nearest whole number 10,562 = 11
- ii. Nearest whole number 10,432= 10
- iii. One decimal place 3.24 = 3,2
- iv. Two decimal places 3,453 = 3,45
- v. One decimal place 3,25 = 3,3
- vi. Two decimal places 3,456 = 3,46

#### Example

A remote rural settlement receives a drum that contains 600 l of water for 36 people in the settlement to share. If the water is shared equally, how many litres of water will each person receive??

$$\frac{600}{36} = 16,666666..$$

The logical way to round of the amount is to 16 l per person. There is likely to be spillage when the water is distributed and so it not practical for such a calculation to be very precise.

$$16 \times 36 = 576l$$

An amount of approximately 4l has been allowed for spillage

#### Example

Answer the following questions and in each case explain why you would round up or down to get a reasonable answer.

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- a) Jacolene is catering for a group of 54 people. The muffins are sold in packs of 8.  
How many packs of muffins must she buy?
- b) A group of learners is going to the Maropeng Centre at the Cradle of Humankind. There are 232 learners and teachers going on the outing. The school needs to hire buses and each bus can carry 50 passengers.
- i. How many buses should they hire?  
ii. How many empty seats will there be?
- c) Ludwe is buying blinds for a large window in his home. Each blind is 100 cm wide.  
The window is 260 cm wide. How many blinds does he need?

### Solutions

a) Number of packs =  $\frac{54}{8}$   
 $= 6,75$

She must buy 7 packs.

b) i. Number of buses =  $\frac{232}{50}$   
 $= 4,64$   
The school will need 5 buses.

ii. Number of empty seats =  $250 - 232$   
 $= 18$  empty seats

c) Number of blinds needed =  $\frac{260}{100}$   
 $= 2,6$

He needs 3 blinds.

### Scientific notation

- A number in scientific notation has only one digit ( not zero) before the decimal comma.
- You can use a calculator to calculate in scientific notation
- Use the **Exp** key or, on modern calculators, the **x10<sup>x</sup>** key for calculations in scientific notation
- You can convert numbers in scientific notation to standard notation

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### Example

$1,874 \times 10^6$

Key sequence: 1 8 7 4 Exp 6  
= 1874000

$8,492 \times 10^{-3}$

Key sequence:  
8 4 9 2 Exp -3  
= 0,008492

- You can multiply, divide, subtract or add numbers in scientific notation:

#### Example

$1,02 \times 10^4 + 2,6 \times 10^3 = 1,28 \times 10^4$

$1.5 \times 10^{-2} \div 2,0 \times 10^3$   
=  $7,5 \times 10^{-6}$

### Example

1. Why do scientists and mathematicians use scientific notation?
2. Write each value in scientific notation.

- a) The mass of dust particle is

0,000000000753 kg

- b) The Andromeda Galaxy contains at least

200 000 000 000 stars.

3. Write each value in standard notation

a)  $5,34 \times 10^5$

b)  $2,45 \times 10^{-3}$

c)  $1,90 \times 10^8$

d)  $4 \times 10^{-4}$

### Answers

1. It is much easier to do calculations that involve either very large or very small numbers when use scientific notation.

2.

a) The mass of dust particle:  $7,53 \times 10^{-10}$

b) The Andromeda Galaxy contains  $2,0 \times 10^{11}$  stars

3.

a) 534 000

b) 0,00245

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- c) 190 000 000
- d) 0,0004

## Ratios

- Ratios are used to compare the sizes of two or more quantities in the same unit.
- We can write ratios as a common fraction example: you can write 4 : 6 as  $\frac{4}{6}$ .
- When using a colon to write a ratio, do not include units of measure. Make sure that the units of the measure are the same. Example 5ml to 250ml is 5 : 250

### Worked example

1. A recipe for pancakes uses 3 cups of flour and 2 cups of milk.  
So the ratio of flour to milk is 3 : 2.

If you need to make pancakes of many people, you may need 4 times the quantity, so you multiple both numbers by 4.

$$3 \times 4 : 2 \times 4.$$

$$12 : 8$$

12 cups of flour and 8 cups of milk. The ratio is still the same

2. There are 80 learners who travel by bus and 120 learners who travel by taxi, then we have a ratio of 80 (bus) to 120 (taxi).  
What is this in its simplest form?

$$80 : 120$$

Means the same as 8 : 12 ( divide both numbers by 10)

Which means the same as 2 : 3 ( simplest form)

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3.

- a) There are 23 nurses in a hospital and 7567 patients. How many patients does each nurse have to care for.
- b) In a grade 10 class, learners are voting for a class badge. 4 learners vote for badge A and 17 vote for badge B. How many learners vote for badge B for each learner voting for badge A?

**Solutions**

a)  $23 : 7567$

$= 1 : 329$

Each nurse must care for 329 patients

- b) Learners voting for badge B = 17 and learners voting for badge a = 4

$$17 : 4$$

$$= 4,25 : 1$$

Approximately 5 learners vote for badge B for every learner who votes for badge A

**Other worked example**

1. Tefo and Tozi sold flowers at a road side stall. Tefo worked for 6 hours and Tozzi worked for 4 hours. They decided to split their profit of R1 595, 60 in the same ratio as the number of hours they worked. How much money did each person get?
2. A photo shop can only make a 3 to 7 enlargement of a photograph of 15 cm. Give the measurement of an enlarged photograph.

**Solution**

1. Add the two ratios:  $6+4 = 10$

Divide the total profit by the sum of the ratios:

$$1595,60 \div 10 = 159,56$$

Multiply each ratio by 159,56

$$6 \times 159,56 = 957,36$$

$$4 \times 159,56 = 638,24$$

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Remember to check your answer. the sum of the two profits must give the total profit

2. Divide 15 by 3 to find the width

$$15 \div 3 = 5 \text{ cm}$$

Multiply 5 by 7 to calculate the length of the enlarged photograph:

$$5 \times 7 = 35 \text{ cm}$$

The enlarged photograph will be 35 cm by 35 cm

## Rates

- ✓ Rates are used to compare two quantities of different units.
- ✓ The word *per* is often used when describing rate. It means for *every or for each*. A slash (/) is often used in the place of *per*. Example rand per hour (R/h), metres per second(m/s), kilometres per hour (km/h)
- ✓ You can use percentages such as  $13\% = \frac{13}{100}$  to calculate rate.

## Example

1. Petrol costs R13,20 per litre.
  - a) How much will you pay for 25l of petrol?
  - b) How many litres of petrol will you be able to buy for R700,00 (rounded off to the nearest litre)?
2. Brian cycles 30 km in 2 hours and 15 minutes.
  - a) Calculate the average speed at which he cycled.
  - b) If Brian maintained this speed, how long would it take him to cover a distance of 45 km?
  - c) If Brian cycled at an average of 15km/h for 3 hours and 15 minutes, what distance would he cycle?

$$\text{Formula: time} = \frac{\text{distance}}{\text{speed}}$$

### Answers

1.
  - a)  $25 \times R13,20 = R330,00$
  - b)  $\frac{700}{13,20} = 53l$
2.
  - a) Convert the time in hours and minutes to hours because speed is measured in kilometres per hour (km/h) or metres per second (m/s) and the distance was given in kilometres.  
To convert minutes to hours, divide by 60.

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$$\frac{15}{60} + \frac{120}{60} = \frac{135}{60} = 2,25 \text{ hours}$$
$$\text{speed} = \frac{30\text{km}}{2,25 \text{ hours}} = \frac{13,3\text{km}}{1\text{hour}} = 13,3 \text{ hours}$$

b)  $\text{Time} = \frac{\text{distance}}{\text{speed}} = \frac{45\text{km}}{13,3 \text{ km/h}} = 3,38 \text{ hours}$

It would take Brian 3 hours and 23 minutes to cycle 45 km.

c) Convert 15 minutes to hours:  $\frac{15}{60}$

$$\frac{180}{60} + \frac{15}{60} = \frac{195}{60} = 3,25 \text{ hours}$$

Distance = speed  $\times$  time

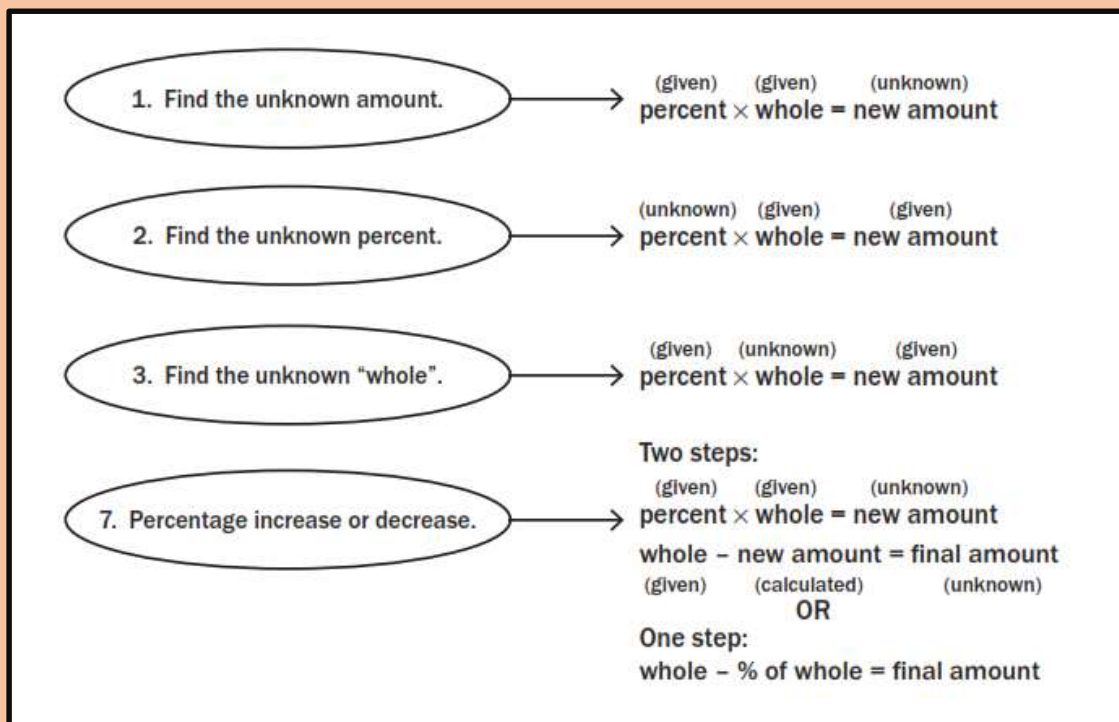
$$= 3,25 \times 15 = 48,8\text{km}$$

Brian cycled 48,8km.

## Percentages

- ✓ To solve a percent problem, first identify the three parts in the calculation.
- ✓ Two of the parts should be given, and you need to calculate the third part.

### Types of percentage problems



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### **Type 1: find the unknown amount**

If you know the whole and the percent, you need to find the unknown amount.

Note: percentage  $\times$  whole = new amount

Example

What is 18% of 300?

Solution

Write the equation:  $18\% \times 300 = \text{new amount}$

$$\frac{18}{100} \times 300 = \text{new amount}$$

$$54 = \text{new amount (remember "of" means "multiply")}$$

### **Type 2: find the unknown percent**

- ✓ If the amount is less than the whole, the percent will be less than 100%.
- ✓ If the amount is greater than the whole, the percent will be greater than 100%

Example

A group of 30 out of 150 learners represents the Grade 12s in athletics, what percentage is this?

Solution

We know the amount, 30, and the whole. The percent is the unknown.

Write an equation: percent  $\times$  whole = amount

$$\frac{30}{150} = 0,2 \times 100$$

$$= 20\%$$

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### Type 3: find the unknown whole

#### Example

You get 40% for a test, or a mark of 28. What is the total number of marks for the test?

Solution

We know the amount, 28, and the percent, 40%. The whole( total marks) is the unknown.

Write an equation: percent  $\times$  whole = amount

$$40\% \times \text{whole} = 28$$

$$0,4 \times \text{whole} = 28$$

$$\text{Whole is } 1 = \frac{28}{0,4}$$

$$\text{Whole} = 70$$

28 marks is 40% of 70marks

The total for the test is 70 marks

### Type 4: Percentage increase or decrease

These kinds of problems combine ordinary percent problems with final addition or subtraction.

#### RULE:

$$\text{New amount} = \text{whole} + (\text{percentage} \times \text{whole})$$

#### Percentage added to an amount (Percentage increase)

Percentage increase on a price means the normal price plus the increase.

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### Example

The price of petrol increases by 12%. The original price was R10,70 per litre. What is the new petrol price

#### Method 1

New price = old price + 12% of old price

New price = R10,70 + 12% × R10,70

$$= R10,70 + 0,12 \times R10,70$$

$$= R10,70 + R1,284$$

$$= R11,984$$

which is R11,98

#### Method 2

New price = old price + 12% of old price

= 112% of old price

$$= 1,12 \times \text{old price}$$

$$= 1,12 \times R10,70 = R11,98$$

### Example

Nomalizo receives a salary increase of 7%. If her new salary is R10 600, what was her salary before the increase?

New salary = original salary + 7% of original salary

R10 600 = (100% + 7%) of original salary

R10 600 = 107% × (original salary)

$$\frac{R\ 10\ 600}{107\%} = \text{original salary}$$

So the original salary is 9 907

NB NB

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### Percentage taken away from an amount (Percentage decrease)

Percentage decrease on a price means the normal price less the decrease

**RULE:**

new amount = whole – (percentage × whole)

### Example

A pair of jeans is on sale with a mark down of 20%. If the original price of the jeans was R199,00, what is the sale price?

#### Method 1

$$\begin{aligned}\text{Discount} &= 20\% \times \text{R}199 \\ &= 0,2 \times \text{R}199 \\ &= \text{R}39,80\end{aligned}$$

$$\begin{aligned}\text{The sale price} &= \text{original price} - \text{discount} \\ &= \text{R}199 - \text{R}39,80 \\ &= \text{R}159,20\end{aligned}$$

#### Method 2

Sale price is normal price less 20%, so sale price is 80% of normal price.

$$\begin{aligned}\text{Sale price} &= 80\% \text{ of } \text{R}199 \\ &= 0,8 \times \text{R}199 \\ &= \text{R}159,20\end{aligned}$$

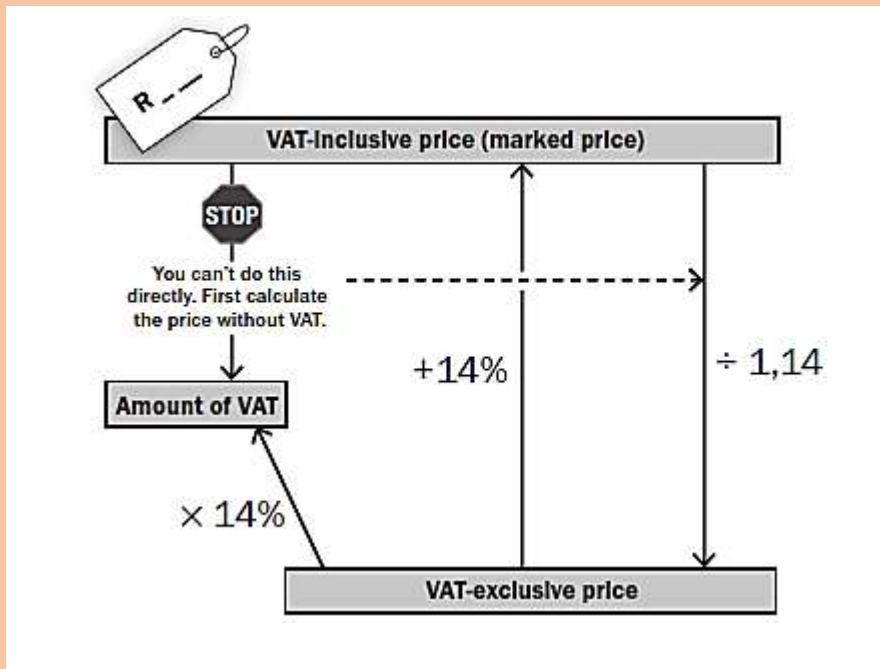
### Working with VAT

All prices that we see in shops include VAT (Value Added Tax). You need to calculate VAT when:

- you are selling something and have to add VAT to the price
- you want to check an invoice and make sure that the correct amount of VAT is included
- VAT-inclusive: means that 14% VAT has already been added to the price
- VAT-exclusive price + amount of VAT = the price including VAT.

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### Example

The item costs R100. It includes 14% VAT.  
VAT was added to the original price.  
The original price + 14% VAT = R100.  
Original price + 14% × original price = R100  
Now think: original price is 100%, so:  
114% × original price = R100  
1,14 × original price = R100  
activity  
original price = R100 ÷ 1,14  
= R87,719

Write down three digits after the decimal comma from your calculator so that you can round off.  
The original price was R87,72.

### Example

The item costs R87,72 excluding 14% VAT.  
VAT must be added to the original price.  
Original price + 14% VAT = VAT-inclusive price  
114% × original price = VAT-inclusive price  
1,14 × original price = VAT-inclusive price  
The VAT-inclusive price is:  
1,14 × R87,72 = R100

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## Time

- Time values can be expressed in different formats, e.g. 8 o'clock, 8:00 a.m., 8:00 p.m. and 20:00. The two most common formats are the 12-hour format and the 24-hour format.
- 12-hour format: 8:00 a.m. and 8:00 p.m. are examples of readings of time using the 12-hour format. This format is seen on analogue clocks and watches. In the diagram below, the short hand shows us the hour and the long hand shows us the minutes. Sometimes a third hand shows the seconds.



- When we use the 12-hour clock, we use the letters “a.m.” to show that the time is before midday (12 o'clock or noon) and “p.m.” to show that it is after midday. For example, school may start at 7:30 a.m. (in the morning) and finish at 2 p.m. (in the afternoon).
- 24-hour format: 20:00 is an example of the 24-hour time format. This format is seen on digital watches, clocks and stopwatches. On digital clocks, the number on the left shows the hour and the number on the right shows the minutes. Some digital watches have a third, smaller number on the far right which shows seconds.
- Sometimes we also speak of “hundred hours format”. In “hundred hours” time format, we replace the colon (:) with an “h”, so, 20:00 is written 20h00.



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### Example

a) Write the following times in the 24-hour format.

- (i) Jane goes to bed at 9:56 p.m.
- (ii) The local shop opens at 8:30 a.m.
- (iii) Archie's cricket practice ends at 4:05 p.m.

b) Write the following times in the 12-hour format.

- (i) David's school day ends at 14:45.

### Solutions

- a) (i)  $09:56 + 12 \text{ hours} = 21:56$
- (ii) 8:30 (This is before midday so it's written the same.)
- (iii)  $4:05 \text{ p.m.} + 12 \text{ hours} = 16:05$
- b) (i)  $14:45 - 12 \text{ hours} = 2:45 \text{ p.m.}$

### Converting units of time

The relationships between the units of time are given in the table below.

Time Conversions
60 seconds = 1 minute
60 minutes = 1 hour
24 hours = 1 day
7 days = 1 week
365 days = approximately 52 weeks = 12 months = 1 year

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### Example

a) It takes John 140 seconds to boil water in a kettle. How many minutes and seconds does the water take to boil?

b) A movie lasts 138 minutes. How long is the movie in hours and minutes?

### Solutions

a) 60 seconds = 1 minute

Therefore 140 seconds =  $\frac{140}{60} = 2,33\dots$

From our answer of 2,33 we know that we have 2 whole minutes and some remainder in seconds.

We can now work backwards to calculate the remainder:

2 minutes = 120 seconds

140 seconds – 120 seconds = 20 seconds

So 140 seconds = 2 minutes and 20 seconds. ( $0,33\dots \times 60 = 20 \text{ sec.}$ )

b) 60 minutes = 1 hour

Therefore 138 minutes =  $\frac{138}{60} = 2,3$  This does not mean 2 hours and 3 minutes!

We know that we have 2 whole hours and some remainder in minutes.

We now work backwards to calculate the remainder:

2 hours = 120 minutes

138 minutes - 120 minutes = 18 minutes

So 138 minutes = 2 hours and 18 minutes. ( $0,3 \times 60 = 18 \text{ minutes}$ )

### Activity

a) A train journey takes 34 hours. How many days and hours does the journey take? (3)

b) A plane trip (with stopovers) from South Africa to China takes 38 hours. How many days and hours does the trip take? (1)

### Solutions

1. 24 hours = 1 day

Therefore 34 hours =  $\frac{34}{24} = 1,417.3$

From our answer of 1,417 we know that we have 1 whole day and some remainder in hours. 3 We now work backwards to calculate the remainder:

1 day = 24 hours

34 hours – 24 hours = 10 hours

So 34 hours = 1 day and 10 hours. ( $0,417 \times 24 \text{ hours} = 10 \text{ hours}$ )

2.  $38 - 24 = 14$

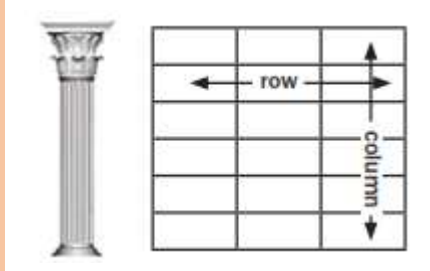
The trip takes 1 day and 14 hrs.

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## Reading Tables

A table is a way of showing information in rows and columns.



Getting information from tables

Reading a table means finding information in the cells. Each block in a table is called a cell. Reading a table is like reading a grid.

Look at the table on the right.

A and B are the column headings.

1, 2, 3, 4, and 5 are the row headings.

- What is in A2? Go across to column A and read down to row 2. A bell.
- What is in B3? A hand.
- Give the row and column for the star. Row 4 and column A. You can also write A4.
- Give the row and column for the clock. Row 5 and column B. You can also write B5.

Look at the table below. In a question, you might have to find information in the table and write it down, or you might have to use the information in the table to do a calculation.

The table below shows the average maximum and minimum temperatures (highs and lows) in Mauritius (measured in degrees Celsius) each month.

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Average monthly maximum and minimum temperatures in Mauritius

Month of the year	Average maximum temperature °C	Average minimum temperature °C
January	35	24
February	30	22
March	30	21
April	29	21
May	25	19
June	24	17
July	26	18
August	27	19
September	29	20
October	32	22
November	32	22
December	34	24

**Look at the table above to answer these questions.**

- Which month of the year had the highest average maximum temperature in Mauritius?
- Which month had the lowest average maximum temperature?
- What is the difference between the average maximum temperature in December and the average minimum temperature in December?

**Solution**

- Reading down the average maximum temperature column, you can see that January has a temperature of 35 °C, and none of the other temperatures are higher.
- The lowest maximum temperature is 24 °C in June.
- Here you will need to find the row for December and look across to get the lowest and highest temperatures for that month, then subtract the lowest temperature from the highest temperature to find the difference:  $34 - 24 = 10^{\circ}\text{C}$ .

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Example

The average monthly increases in the cost of electricity (excluding VAT) between 2011 and 2012

	Electricity consumption in kWh			
	50	150	600	1 000
Amount payable in 2011	R27,35	R85,83	R393,67	R728,63
Amount payable in 2012	R28,83	R94,99	R467,43	R888,83
Increase between 2011 and 2012	R1,48	R9,16	R73,67	R160,20
Percentage Increase between 2011 and 2012	5,39%	10,67%	18,74%	21,99%

Read from the table to answer the questions.

- If a household used 600 kWh of electricity in 2011, what would they have paid?
- How much more would you pay for 1 000 kWh of electricity in 2012 compared to 2011?  
Step by step comment
- What was the percentage increase for 150 kWh of electricity between 2011 and 2012?
- Was the percentage increase higher for lower electricity consumption, or for higher electricity consumption?

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Solution**

When you answer a question like this, take a few minutes to look at the table and write down some notes about what it shows. Don't get too detailed, just to understand what the table is showing.

The columns show 4 different amounts of electricity consumption. The unit is kWh.

	Electricity consumption in kWh			
	50	150	600	1 000
Amount payable in 2011	R27,35	R85,85	R393,67	R728,63
Amount payable in 2012	R28,83	R94,99	R467,43	R888,83
Increase between 2011 and 2012	R1,48	R9,16	R73,67	R160,20
Percentage increase between 2011 and 2012	5,39%	10,67%	18,74%	21,99%

First row shows the cost for 2011 and 2nd row shows 2012. This is what the table is comparing.

These amounts are calculated for us! These are differences between 2011 and 2012: Amount and Percentage.

a) Read off the 2011 row showing the amount, and the 600 kWh column: R393,67.

b) You don't have to calculate; this difference is given in the third row.

c) The percentage increase is given in the last row. So look at the last row and second column (for 150 kWh): 10,67%.

d) In the fourth row, there is a steady increase in the percentages from lower to higher electricity consumption. So the percentage increase is bigger for higher consumption.

### Reading Two-Way Tables

- Two-way tables are a useful way to display information, and they help you to work out missing information.
- These tables show the numbers of two categories for the same sample.
- One category is shown in rows, and the other category is shown in columns.
- For example, the table below shows how many Grade 12 learners in a school own a cell phone or not and how many of the same learners own a music player or not.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

	Own an MP3 player	do not own an MP3 player
Own a cell phone	57	21
do not own a cell phone	13	9

	Own an MP3 player		Total
Own a cell phone	57	21	78
do not own a cell phone	13	9	22
Total	70	30	100

### Example

During one month, 75 of the 180 babies born in a hospital were boys, and 40 of the babies weighed 4 kg or more. There were 26 baby boys who weighed 4 kg or more.

- a) Put this information in a two-way table and fill in the missing numbers.  
 b) What percentage of girl babies weighed 4 kg or more?

### Solution

a) First draw up the grid and fill in the information given. (It doesn't matter whether you put the weights or the gender in the columns or rows.)

	Boys	Girls	Total
Weighed less than 4 kg			
Weighed 4kg or more	26	0	40
Total	75		180

When you've got the table in this form, you can find the missing information. Work back from the totals. For example, if 26 of the baby boys weighed 4 kg or more  $75 - 26 = 49$  of them weighed less than 4 kg

	Boys	Girls	Total
Weighed less than 4kg	49	94	140
Weighed 4kg or more	26	14	40
Total	75	105	180

b) There were 14 girl babies who weighed 4 kg or more, out of a total of 105 girl babies  $\frac{14}{105} \times 100 = 13,33\%$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Mixed exercises

1. The following recipe is sufficient for 10 pancakes. Increase the quantity so that you can make 25 pancakes.

Pancake recipe	5 ml baking powder
250 ml cake flour	1 egg
1 ml salt	125 ml water
125 ml milk	12,5 ml oil


2. Mr Abdallah invited 13 friends to his birthday party. His mother bought six large pizzas and she cut each one into eight equal slices. How many pizza slices are there for each person?


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3. The temperature in Sutherland at 12 o' clock in the afternoon is  $14^{\circ}\text{C}$ . By 12 p.m, the temperature had dropped by  $16^{\circ}\text{C}$  due to a cold front.

a) What was the temperature at 12 p.m


b) By 4 a.m, the temperature had dropped another  $2^{\circ}\text{C}$ . What the temperature at 4 a.m.?


4. Mokoena got 57 out of 75 answers correct for a test.

a) What fraction of answers did she get correct?


b) What percentage did she get?


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

5. For physical sciences, Pinky had to pour 50 ml of a solution into six test tubes. She poured 7,5 ml into the first test tube, and then she shared the rest equally between the other test tubes. How much solution did she pour into each of the five test tubes?


6. Joseph has R225,00 in his bank account.  
a) He withdraws R355,50. Calculate his balance.


- b) He deposits R1 460,00 into his account. Calculate his balance.


7. There are 206 bones in the human body. The table shows how many bones there are in each part of the body. Round off answers to two decimal places.

head	Back	Chest	Both arms	Both legs
29	26	25	64	62

- What fraction of the total number of bones is in each part?  
a) The head


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

b) The back


c) The chest


d) The arms and legs


8. Carlos finds the information below on a 125-g packet of potato chips.

Nutritional information ( 1 calorie = 4,186kj)		
Nutrients	Per 100g	Per 30g
Energy	2178 kj	653 kj
Protein	7,4 g	2,2 g
Carbohydrates	45,0 g	13,5 g
Sugars	0,7 g	0,2 g
Fats	35,0 g	10,5 g
Dietary fibre	4,0 g	1,2 g
sodium	0,7 g	0,2 g

a) What ratio fats to carbohydrates will Carlos consume when he eats the whole packet (125 g) of potato chips? Give your answer in its simplest form.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- b) Calculate the nutrient intake if he eats the whole packet of potato chips (125 g).


- c) The recommended daily nutrient intake for an 18-year-old girl with a height of 161 cm and a mass of 54 kg is 2 100 calories. If an 18-year-old girl eats the whole packet of potato chips (125 g), what percentage of her recommended daily energy allowance has she consumed?


9. A jewellery store runs a promotion of 20% discount on all their watches.  
a) How much discount will you get on a watch with a price tag of R899,95?


- b) What is the sale price of the watch?


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

10. Peter wants to know what his term mark for Mathematical Literacy is. His teacher told him the average of the following marks will be used to calculate his term mark:

Class test:  $\frac{17}{35}$       Term test  $\frac{26}{40}$       Assignment  $\frac{19}{25}$       Project  $\frac{41}{60}$

a) Calculate Peter's term mark (to the nearest percentage).


b) In the second term, Peter got  $\frac{86}{150}$  for his Mathematical Literacy exam.

His average mark for tests and assignments in Mathematical Literacy was  $\frac{72}{120}$  in the second term. Examinations count 75% of the term mark

and the rest of his mark count 25%. Calculate Peter's second term mark ( to the nearest percentage).


11. The length of the sides of a triangle are in the ratio 4 : 7 : 9. The perimeter of the triangle is 596 cm. what is the length of each side of the triangle?


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

12. In total, 45 000 Grade 12 learners are writing the final Grade 12 examination. If each learner uses a minimum of seven pages for each of his or her seven objects, how many pages will be used in total during the final Grade 12 exams? Give your answer in scientific notation correct to two decimal places.


13. Builders mix concrete using sand, stones (gravel) and cement in the ratio 3 : 2 : 1. If the builder needs to mix 360kg of cement, how much of each constituent does he need?


14. The winner of stage 15 in the Tour De France cycle race completed the 187 km in 4 hours and 52 minutes. What was his average speed for stage 15? Round off your answer to 2 decimal places.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

15. Write the following values in scientific notation.

a) The equatorial diameter of the planet Saturn is 120 536 km.


b) The orbit distance of Saturn from the sun is 1 429 400 000 km.


c) The speed of light is 299 790 000 m/s (metres per second).


d) A light year is a distance of 9 460 500 000 000 000 m.


16. In a gymnastic competition, the judges use the formula  $S = 0,6DT$  to calculate the score of a particular event, where S represents the score, D represents the degree of difficulty and T represents the total score of judges.

a) Calculate the score of a gymnast who executed an event with degree of difficult of 2,5 and for whom the score of the judges was 36,9.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

b) What was the degree of difficult if the score was 85,5 and the total score of the judges was 38,5? Give your answer correct to one decimal place.


c) What was the total score of the judges if the degree of difficulty was 29,5? Give your answer correct to one decimal place.


17. Wendy bought an antique chair for R8 599,00. She sold it to a collector for R 10 000,00. Calculate herf percentage profit. Round of your answer to one decimal place.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

18. Mr Smith bought a powerboat for R34 000,00. He sold it two years later for R28 000,00. Calculate the percentage loss. Round off your answer to two decimal places.


19. A school is concerned about the increase in the number of overweight learners at school. All learners were provided with the following information asked to calculate their own body mass index (BMI)  $BMI = \frac{\text{weight (kg)}}{\text{height (m)}^2}$

a) Calculate the BMI for the following learners in a copy of the table. Round off your answer to one decimal place.

Learner	Mass (kg)	Height	calculation	Result
A	51	1,2		
B	77	1,7		
C	45	1,5		
D	47	1,6		

b) What advice would you give the four learners regarding their weight?


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

20. Write the following values in standard notation.

a) The average distance of the moon from earth is  $3,84 \times 10^5$  km.


b) The volume of the moon is  $2,197 \times 10^7$  km<sup>3</sup>


c) The mass of the moon is  $7,3483 \times 10^{22}$  kg.

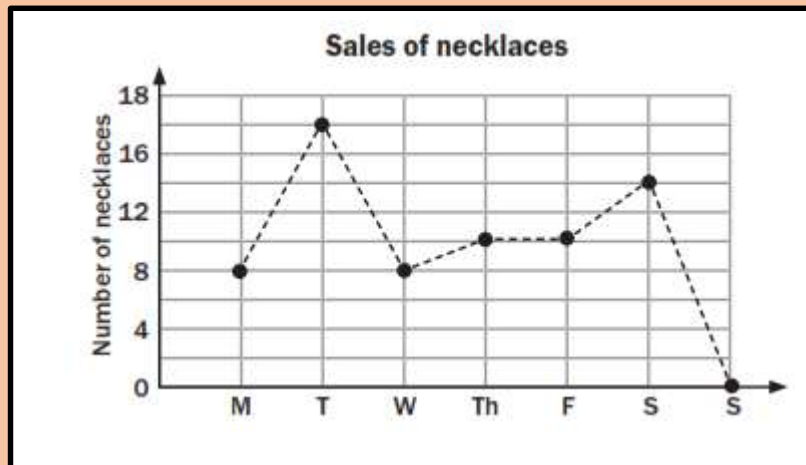

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Patterns and graphs

### Example interpreting graphs

Naledi makes and sells beaded necklaces. Look at the graph below and answer the questions.



- On which day are the most necklaces sold? How many were sold on this day?
- On which day were there no sales? Give a possible reason for this.
- Between which two days is the biggest increase in sales? Explain.
- Between which two days do the sales stay the same?
- Describe what happens to the sales between Wednesday and Thursday.
- Why is the graph drawn with a dotted line?

### Solutions

- On Tuesday, 17 necklaces.
- Sunday. People are not usually shopping on Sundays.
- Between Monday and Tuesday. Difference is  $17 - 8 = 9$ .
- Between Thursday and Friday.
- There is an increase in sales of 2 necklaces.
- This is a discrete graph, because necklaces are sold in whole numbers.

### More than one line on the same graph

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

A graph can have more than one line. The aim is to compare two or more different situations. You will often see this in questions about finances.

- We can put two graphs on the same set of axes, if they both compare the same two variables.
- The point where the two graphs meet is sometimes called the **break-even point**. (The values for the two graphs are the same at this point.)

### Example

David's shop buys solar lamps for R45 each. He marks up the prices and sells them for

R100 each. His monthly expenses (fixed costs) are R12 000.

- (i) Which expenses change? These are variable costs.
  - (ii) Which expenses stay the same? These are fixed costs.
- b) Fill in both blank rows in the table below.

Number of lamps bought and sold	0	100	200	300	400	500
Total expenses						
Income						

- On the same grid, draw a graph of the total expenses and a graph of his income.
- Read from the graphs the number of lamps David needs to sell to break-even (not to make a profit or loss).

(Assume that the amount is rounded off to the nearest R1 000 at this point).

### Solutions

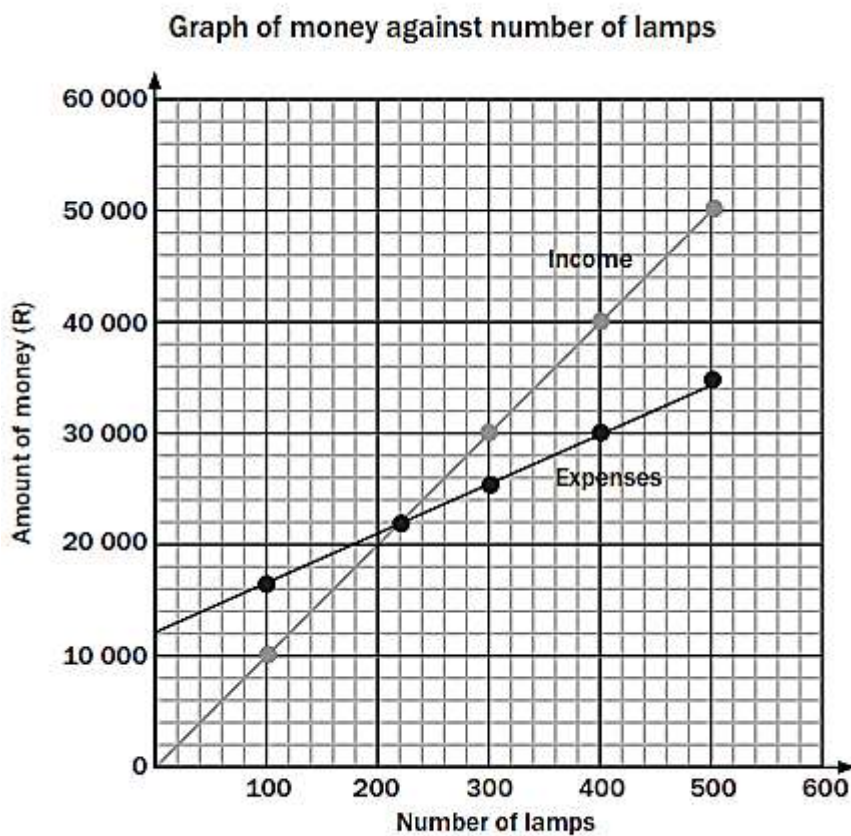
- (i) buying the lamps
  - (ii) R12 000
- c) Total expenses = R12 000 + (number of lamps × R45)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Number of lamps bought and sold	0	100	200	300	400	500
Total expenses	12 000	16 500	21 000	25 500	30 000	34 500
Income	0	10 000	20 000	30 000	40 000	50 000

c) Graph:



d) The break-even point is at 220 lamps.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Finance

### Financial documents

#### Till Slips

Every time you buy an item from a shop, you should receive a till slip. By law, South African till slips must include:

- the name of the shop
- the address of the shop
- the VAT number of the shop
- the words "Tax Invoice"
- the shop's invoice number
- the date and time of the sale
- a description of the items or services bought
- the amount of VAT charged (14%)
- the total amount payable.

VAT is not charged on some essential groceries in South Africa. These include : paraffin; brown bread; maize meal; samp; mealie rice; dried mealies; dried beans; lentils; tinned sardines; milk powder; milk; rice; vegetables; fruit; vegetable oil and eggs.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Worked example 1

Boiketlo goes to buy groceries at the Sunshine Superette. Study the till slip below and answer the questions that follow.

SUNSHINE SUPERETTE		
Welcome to our Store 7th Street Melville Tel No: 011 482 1092 VAT NO 1340763486 ---TAX INVOICE---		
Retain as proof of purchase LAST DAY FOR A FULL REFUND IS 27/07/2013		
VEGETABLE SOUP INST	R6.95	
MINI TENNIS BISCUIT	R3.95	
50G BILTONG	R19.99	
24 LITRE VTC (FOODS)	R0.44	
500ML VEG OIL	R16.99 *	
YOGHURT 175G	R5.49	
BREAD/BROWN	R6.99 *	
1L MILK/LOW FAT	R11.95 *	
COTT/CHEESE 250G	R15.99	
SHAMPOO	R15.99	
MUFFINS/CHOC	R13.95	
11 BALANCE DUE	<b>R130.27</b> A	
CASH PAYMENT	R150.00	
CHANGE	R19.75	
Rate	Vat	TOTAL
14.00%	<b>11.59</b> B	<b>94.34</b> C
* 0.00%	0.00	<b>35.93</b> D
20/05/2013 10:15 CASHIER - Babalwa Noza		
Visit Our Website <a href="http://www.sunshinesuper.co.za">www.sunshinesuper.co.za</a> Customer helpline 086 1456 345		

- How did Boiketlo pay for her shopping?
- How much does 1 litre of vegetable oil cost at the Sunshine Superette?
- If there are 6 muffins in the pack of chocolate muffins that Boiketlo bought, how much does each muffin cost?
- What is the last date for a refund and why might Boiketlo need a refund?
- Boiketlo gave the cashier R150,00 and received R19,75 and change.
  - Calculate what she paid for her shopping.
  - Why do you think the amount is slightly different to the balance due?

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

f) Why do three items (vegetable oil, brown bread and milk) have stars next to them?

g) (i) Add up the total of the items which are subject to VAT.

(ii) Calculate the VAT (14%) of the total value of these items. Which letter (A, B, C or D) on the till slip does this correspond to?

(iii) Add the 14% VAT to the total value of the items which are subject to VAT. Which letter (A, B, C, or D) on the till slip does this correspond to?

(iv) Add up the total of the three items that are exempt from VAT. Which letter (A, B, C or D) on the till slip does this correspond to?

(v) Add together the total (including VAT) of the items that include VAT and the total of the VAT exempt items. Which letter on the till slip does this correspond to?

### Solutions

a) She paid with cash.

b) 500 ml of vegetable oil costs R16,99, so 1 litre costs  $R16,99 \times 2 = R33,98$ .

c) 6 muffins cost R13,95, so one muffin costs  $R13,95 \div 6 = R2,33$ .

d) 27/07/2013. She may need a refund if the food she bought is stale.

e) (i)  $R150,00 - R19,75 = R130,25$ .

(ii) The amount she paid is 2c less than the balance due. The total has been rounded to the nearest multiple of 5c because we no longer use 2c and 1c coins in South Africa.

f) The three starred items are exempt from VAT, because they are basic foodstuffs.

g) (i)  $R6,95 + R3,95 + R19,99 + R0,44 + R5,49 + R15,99 + R15,99 + R13,95 = R82,75$ .

(ii)  $14\% \text{ of } R82,75 = 82,75 \times 0,14 = R11,59$ : Letter B.

(iii)  $R82,75 + 11,59 = R94,34$ : Letter C.

(iv)  $R16,99 + R6,99 + R11,95 = R35,93$ : Letter D.

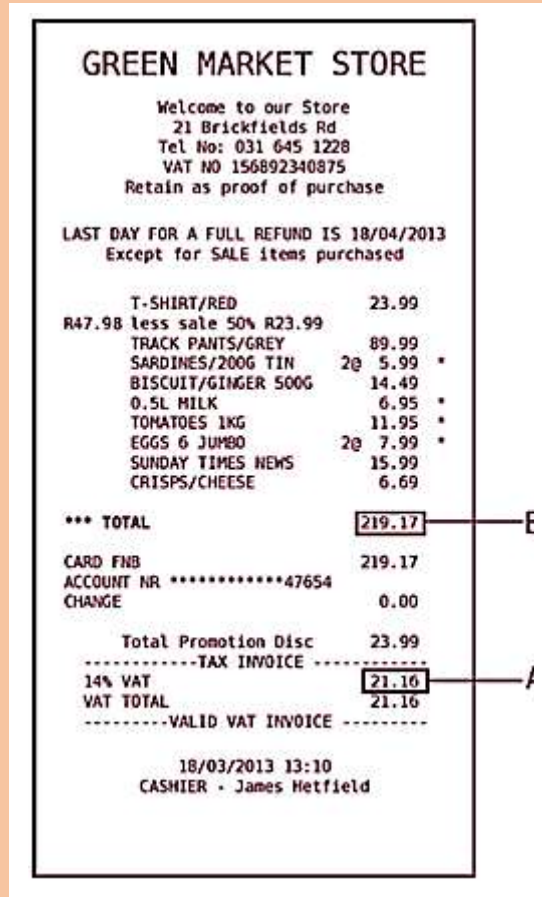
(v)  $R94,34 + R35,93 = R130,27$ : Letter A.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

Sakhile goes to his local store and buys some clothes and groceries. He receives the following till slip. Study the slip and answer the questions that follow.



1. What item did Sakhile buy on sale, and how much was the discount? (2)


2. Can Sakhile return the sale item for refund? Explain your answer. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3. How many eggs did Sakhile buy? (1)


4. Calculate the total value of the VAT exempt items Sakhile bought. (2)


5. Demonstrate how the amount indicated by Letter A was calculated. Show all your calculations. (3)


6. Demonstrate how the amount indicated by Letter B was calculated. Show all your calculations. (5)








[15]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Account statements

At some clothing and food stores, it is possible to open an account, buy goods on credit and pay off what you owe the store on a monthly basis.

     		<p>Pay your total due every month to have credit when you need it</p>																									
<p><b>MISS BN DUBE</b>  <b>25 HARRINGTON HOUSE</b>  <b>BEACH RD</b>  <b>PORT ELIZABETH</b></p> <p><b>7450</b></p>		<table border="1"> <tr> <td><b>CREDIT AVAILABLE</b></td> <td><b>MISS BN DUBE</b></td> </tr> <tr> <td><b>3307.00</b></td> <td><b>4056747070001001001</b></td> </tr> <tr> <td>Date: <b>07/05/12</b></td> <td>Instalment: <b>240.00</b></td> </tr> <tr> <td>Account Number: <b>4056747070001001001</b></td> <td>Overdue: <b>0.00</b></td> </tr> <tr> <td></td> <td><b>Total Due: 240.00</b></td> </tr> </table>	<b>CREDIT AVAILABLE</b>	<b>MISS BN DUBE</b>	<b>3307.00</b>	<b>4056747070001001001</b>	Date: <b>07/05/12</b>	Instalment: <b>240.00</b>	Account Number: <b>4056747070001001001</b>	Overdue: <b>0.00</b>		<b>Total Due: 240.00</b>															
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<p>Edgars, Boardmans, Prato, Temptations and CNA trading as divisions of Edcon (Pty) Limited.          1 Press Avenue, Crown Mines, 2092. Registration No. 2007/003525/07 NCR Reg. No. NCRCP82 EMAIL: ACCOUNTSCTN@EDCON.CO.ZA</p>																											
<b>STATEMENT</b>																											
<table border="1"> <thead> <tr> <th>DATE</th> <th>REF NO:</th> <th>DETAILS</th> <th>AMOUNT</th> <th>BALANCE</th> </tr> </thead> <tbody> <tr> <td>25/04/12</td> <td></td> <td>OPENING STATEMENT BALANCE</td> <td></td> <td>692.42</td> </tr> <tr> <td></td> <td></td> <td>ATM PAYMENT</td> <td>240.00-</td> <td>452.42</td> </tr> <tr> <td>24/04/12</td> <td></td> <td>6 MONTHS PLAN</td> <td>99.95</td> <td>552.37</td> </tr> <tr> <td>25/04/12</td> <td></td> <td>PURCHASE EDG WALMER PARK</td> <td>190.00</td> <td>742.37</td> </tr> </tbody> </table>			DATE	REF NO:	DETAILS	AMOUNT	BALANCE	25/04/12		OPENING STATEMENT BALANCE		692.42			ATM PAYMENT	240.00-	452.42	24/04/12		6 MONTHS PLAN	99.95	552.37	25/04/12		PURCHASE EDG WALMER PARK	190.00	742.37
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25/04/12		PURCHASE EDG WALMER PARK	190.00	742.37																							
<p>Due Date: <b>01/06/12</b></p> <p>Amount Enclosed:</p> <p>Use the Account Number above as your Reference number if you are paying electronically, and please ensure your bank links your payment to the following bank account:</p> <p><b>FNB BRANCH CODE 251105</b>  <b>ACCOUNT NUMBER 50451141440</b></p> <p>PLEASE NOTE: Even if you don't receive a statement every month, you must pay Total Due to avoid late payment charges</p>																											
<p><b>CREDIT LIMIT</b></p> <p>You now have: <b>4049</b>          You qualify for:</p> <p>For credit limit increases, account enquiries and address or telephone number changes call:</p> <p><b>0860 112 442</b>          (South Africa, Lesotho and Swaziland)  <b>061 225 432</b>          (Namibia)  <b>0800 133 268</b>          (Botswana)</p> <p>Office Hours:          Mon-Wed 09:00 - 18:00          Thur 09:00 - 19:00          Fri 09:00 - 21:00          Sat 09:00 - 18:00          Sun &amp; Public Hol 09:00 - 17:00</p> <p>Late charges at <b>22.10%PA</b> will be added to overdue accounts.</p> <p>A 50.00 service administration fee will be charged on all processed payments that</p>																											
<table border="1"> <tr> <td><b>CLOSING STATEMENT BALANCE</b></td> <td><b>742.37</b></td> </tr> </table>			<b>CLOSING STATEMENT BALANCE</b>	<b>742.37</b>																							
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<p>FROM 6 MAY 2012, THE PREMIUM ON YOUR EDGARS ACCOUNT PROTECTION PLAN AND/OR ACCOUNT PARTNER PROTECTION PLAN WILL INCREASE FROM 33 CENTS PER 100.00 TO 35 CENTS PER 100.00. FOR FURTHER INFORMATION CALL 0860 112 442.</p>																											

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Example

Bulelwa has an Edgars store account. She receives the account statement shown above.

- a) At which six stores can Bulelwa use her store card?
- b) (i) How much must she pay on her account?  
(ii) When is this amount due?  
(iii) Will she be charged extra if she pays the due amount late? If so, how much?
- c) How much did Bulelwa pay into her account on 25/04/2012?
- d) (i) How much credit does she still have available?  
(ii) What is the difference between “credit available” and “credit limit”?
- e) How much is the balance brought forward from the previous statement?
- f) How much did Bulelwa spend at Edgars in the month of April 2012?
- g) The closing balance on this statement includes 14% VAT. Calculate the VAT included in the closing balance of R742,37.

### Solutions




- a) Edgars, Boardmans, Prato, Temptations, CNA and Red Square.
- b) (i) R240,00.  
(ii) 01/06/2012.  
(iii) Yes. A charge of 22,10% per annum is added to late payments.
- c) She paid R240,00 into her account.
- d) (i) Bulelwa has R3 307,00 credit on her account.  
(ii) Credit available is how much credit Bulelwa has left. Credit limit is how much credit is allowed in total, at any one time (i.e. she can buy items totalling R4 049 on credit).
- e) R692,42.
- f)  $R99,95 + R190,00 = R289,95$ .
- g) The closing balance is 114% of the balance before VAT was added. The VAT is 14% of this final amount. So,  $VAT = R742,37 \div 114\% \times 14\% = R742,37 \times 14 / 114 = R91,17$ .

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

#### Reading an account statement

	Jet Stores		Edgars Stores		CBS stores
Ms D T Bears 222 Straight Str Hababa City 1313			Credit available: R1 550,35		
			Date: 02/06/2011		
			Account number: 3472411756		
			Statement e-mail address debt@jetstores		Instalment R280.00
Date	Ref. no.	Details	Amount	Balance	Total Due R280.00
22/05/11		Opening balance		3 450.15	Due Date 07/06/2011
22/05/11		Cash payment Thank you!	280.00	3 170.15	Credit limit R5 600.50
23/05/11		12 months plan Purchase Jet Menlyn	55.50	3 225.65	Enquiries 0860231453
		Purchase Jet Menlyn	120.15	3 345.80	Office Hours 8:00 -18:00
		Purchase Jet Menlyn	500.00	(a)	
Closing balance				(b)	

Study the account statement above and answer the following questions.

1. What is Daisy's opening balance? (1)

2. How much is her credit limit? (1)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3. Why is there a due date on the statement? (2)


4. Calculate the value of the goods she purchased this month. (2)


5. Calculate the values (a) and (b). (2)


6. The company charges 33% per annum on late payments. How much will Daisy owe if she does not pay the R280,00 installment until 07/07/2011? (6)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

7. The closing balance includes VAT. Calculate the original total, excluding VAT. (2)


8. Why is the “Credit Available” amount not the same as the “Credit Limit”? (2)


## **Bills**


### **Municipal bills**

A household must pay municipal charges for rates, water and electricity.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Page 1 of 2



LET'S LIVE TOGETHER | WELKOM SAAMSAAM | SIMA SAAMSAAM

**THIS CITY WORKS FOR YOU**

02096717502 / 02096717502

**MRS J. GWAYI**  
145 GORDON AVE  
MOWBRAY  
7853

Civic Centre  
12 Hertzog Boulevard 8001  
PO Box 655 Cape Town 8000  
VAT Registration number  
4500193497

Tax Invoice number **160003571479**

Customer VAT registration number \_\_\_\_\_

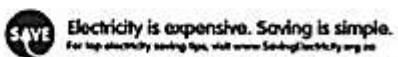
Account number **634812459**

Distribution code \_\_\_\_\_

Business partner number **1001923733**

Tel: 086 010 3089 - Fax: 086 010 3090  
Tel: overseas clients +27 21 401 4701  
E-mail: [accounts@capetown.gov.za](mailto:accounts@capetown.gov.za)  
Correspondence: Director: Revenue, P O Box 655, Cape Town 8000  
Web address: [www.capetown.gov.za](http://www.capetown.gov.za)

Account summary as at 23/08/2013		Due date 19/09/2013
At 145 GORDON AVE / MOWBRAY / Erf 26146		
Previous account balance		2032.67
Less payments (29/07/2013) Thank you		349.67-
<b>Arrears (a)</b>	<b>Payable immediately</b>	<b>1683.00</b>
Latest account - see overleaf		393.72
<b>Current amount due (b)</b>	<b>Payable by 19/09/2013</b>	<b>393.72</b>
<b>Total (a) + (b) above</b>	<b>Total (a) + (b)</b>	<b>2076.72</b>
<b>Total liability</b>	<b>2076.72</b>	



**Our dam levels are below average - save water and repair leaks.**


**Please note:**

- Cheques must be made payable to the City of Cape Town. Post-dated cheques will not be accepted.
- Interest will be charged on all amounts still outstanding after the due date.
- Failure to pay, could result in your water and/or electricity supply being disconnected/restricted. Immediate reconnection of the supply after payment cannot be guaranteed. A disconnection fee will be charged and the amount of your deposit may be increased.
- You may not withhold payment, even if you are engaged in a dispute with the City concerning this account.
- A convenient debit order facility is available. For further details please phone 086 010 3089.
- Bank charges on payment amounts in excess of R4 000,00 made by credit/debit card will be debited to your account.
- When making a direct deposit at ABSA Bank, please state your account no. 209671750.
- Register at your bank for internet payments. Log onto your bank's website and select 'City of Cape Town Municipality' and insert your nine-digit municipal account number in the beneficiary reference field. Please ensure that there are no spaces between the numbers.

Payment: At any City of Cape Town cash office or the following:

**ABSA Checkers SHOPRITE Post Office**

MRS J. GWAYI



>>>> 915552096717502

Account number **634812459**

Amount due if not paid in cash **2076.72**

Amount due if paid in cash **2076.70**

Rounded down amount carried forward to next invoice **0.02**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Example

Look at the municipal bill given on the previous page.

- a) Mrs Gwayi received the above municipal invoice for electricity and refuse.
- (i) At which four stores or outlets can she pay for electricity and refuse?
- (ii) If Mrs Gwayi wants to query this bill, what number should she phone?
- b) (i) According to the bill, when did Mrs Gwayi last make a payment to the municipality?
- (ii) How much was her last payment?
- c) If Mrs Gwayi receives the invoice on 10 September 2013:
- (i) What is the minimum amount that she needs to pay immediately?
- (ii) What additional amount must she pay before 19 September?
- d) If Mrs Gwayi wants to pay her invoice in full, what is the total amount she owes?
- e) The total amount due ('total liability') includes 14% VAT but that percentage is not listed separately on this invoice. Calculate the VAT included in the total amount. Round off your answer to 2 decimal places.


### Solution

- a) (i) She can pay at Absa, Checkers, Shoprite and the Post Office.
- (ii) 086 010 3089
- b) (i) 29/07/2013
- (ii) R349,63
- c) (i) R1 683,00
- (ii) R393,72
- d) R2 076,72
- e) Total amount = R2 076,72
- $$\text{VAT} = 2\,076,72 \times 14 \div 114$$
- $$= \text{R}255,04$$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Exercise:** Study the Eskom bill below and answer the questions that follow.




ESKOM HOLDINGS SOC LIMITED REG NO 2002/015527/06  
VAT REG NO 4740101508

**DU PLESSIS, ROBERT  
PO BOX 8453  
PORTERVILLE  
7925**

**CENTRAL REGION  
PO BOX 8610 JHB 2000**

**CONTACT CENTRE:** (0860) 037566  
**FAX NO:** (0860) 979065  
**E-MAIL:** CENTRAL@ESKOM.CO.ZA  
**WEB:** WWW.ESKOM.CO.ZA



**TEL:** 08000 37556  
**SMS:** 082 941 3707  
083 647 1931  
084 653 5778

**CUSTOMER SELF SERVICE WEBSITE:**  
<http://csonline.eskom.co.za/>

**CENTRAL REGION  
PO BOX 8610 JHB 2000**

**DIRECT DEPOSIT DETAIL**  
**BANK:** First National  
**BRANCH CODE:** 253403  
**BANK ACC NO:** 62005191077

YOUR ACCOUNT NO	6392794507
SECURITY HELD	3097.90
BILLING DATE	2012-07-12
TAX INVOICE NO	639279492961
ACCOUNT MONTH	JULY 2012
CURRENT DUE DATE	2012-08-06
VAT REG NO	NOT SUPPLIED
NOTIFIED MAX DEMAND	25.00

# TAX INVOICE

E-MAIL: No email address supplied

READING TYPE: ACTUAL	READING DATES: 2012/05/10 - 2012/07/10	NO OF DAYS: 61	SEASON		
Your next actual reading will be on 10/08/2012					
CONSUMPTION SUMMARY FOR BILLING PERIOD					
METER NUMBER	PREV. READING	CURR. READING	DIFFERENCE	CONSTANT	CONSUMPTION
356413	36067.0000	39034.0000	3,019.0000	1,0000	3,019.0000
382471	60664.0000	63437.0000	2,773.0000	1,0000	2,773.0000
382709	50248.0000	50556.0000	608.0000	1,0000	608.0000
<b>TOTAL ENERGY CONSUMED FOR BILLING PERIOD (kWh)</b>					<b>6,400.00</b>

PREMISE ID NUMBER: 9161190613 TARIFF NAME: Homepower Standard

STAND 00145 128 OAK STREET

Energy Charge (<= 50 kWh) 83 kWh @ R0.5883 /kWh : (for 51 of 30 days)	R	50.01
Energy Charge (<= 50 kWh) 17 kWh @ R0.5733 /kWh : (for 10 of 30 days)	R	9.75
Energy Charge (> 50 kWh <= 350 kWh) 510 kWh @ R0.7309 /kWh : (for 51)	R	372.78
Energy Charge (> 50 kWh <= 350 kWh) 100 kWh @ R0.7159 /kWh : (for 10)	R	71.59
Energy Charge (> 350 kWh <= 600 kWh) 524 kWh @ R1.0942 /kWh : (for 51)	R	465.04
Energy Charge (> 350 kWh <= 600 kWh) 83 kWh @ R1.0792 /kWh : (for 10)	R	89.57
Energy Charge (> 600kWh) 4,331 kWh @ R1.2021 /kWh : (for 51 of 39 day)	R	5,206.30
Energy Charge (> 600kWh) 849 kWh @ R1.1871 /kWh : (for 10 of 33 days)	R	1,007.85
Retail Environmental levy charge 5,351 kWh @ R0.02 /kWh	R	107.02
Retail Environmental levy charge 1,049 kWh @ R0.035 /kWh	R	36.72
<b>REBILLED ADJUSTMENTS</b>	(Summary - See attachment for details)	R -3,062.70
<b>TOTAL CHARGES FOR BILLING PERIOD</b>	R	4,353.85

ACCOUNT SUMMARY FOR JULY 2012

BALANCE BROUGHT FORWARD (Due Date 2012-07-14)	R	2,520.23
PAYMENT(S) RECEIVED Direct Deposit - 2012-06-27	R	-2,520.25
<b>TOTAL CHARGES FOR BILLING PERIOD</b>	R	4,353.85
VAT RAISED ON ITEMS AT 14%	R	609.54


ACCOUNT NO / REFERENCE NO  
**6392794507**

NAME  
**DU PLESSIS, ROBERT**

FAX NUMBER

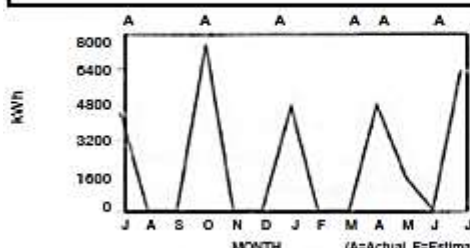
9207 2639 2794 5076

9207 2639 2794 5076



ARREARS			CURRENT	TOTAL AMOUNT DUE	R	4,963.42
>90 DAYS	61-90 DAYS	31-60 DAYS				
0.00	0.00	0.00	4,963.42	<b>TOTAL AMOUNT DUE</b>	<b>R</b>	<b>4,963.42</b>

Balance brought forward is reflected in the current amount and must be paid by 2012-17-14 to avoid disconnection. Please ignore if already paid.



MONTH (A=Actual, E=Estimate)

Message

Save electricity if you are not using an appliance, please switch it off

**TOTAL AMOUNT DUE**

**4,963.40**

**PAYMENT ARRANGEMENT**

INSTALLMENT

ARREARS

DUE DATE

AMOUNT PAID

LATE PAYMENT CHARGES WILL BE ADDED TO OVERDUE ACCOUNTS

PAGE RUN NO	PP1624
BILL GROUP	
BILL PAGE	1 OF 2

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Mr du Plessis gets the account for his electricity consumption over 2 months (see above bill). He has three electricity meters on his property for two small houses and a flat on the premises and they are billed together.

1. a) What is the total amount due? (1)


b) What does “billing period” mean and how long is it in this case? (4)


c) When did Mr du Plessis last pay his electricity account and how much did he pay? (2)


d) Why is the amount for “Payment(s) Received” negative (–R2 520,25)? (3)


d) What do you think “Balance brought forward” means? (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2. The consumption levels for the first two meters listed (meter numbers 356413 and 382471) are fairly similar, both close to 3 000 kWh. The consumption level for the third meter (number 382709) is much lower.

a) Why do you think this might be so? (2)


b) Give examples of factors that might increase a household's electricity consumption. (2)


3. The graph in the bottom left corner of the invoice shows the meter readings for Mr du Plessis' electricity consumption over the previous 12 months.

a) What do you think the letters under the horizontal axis mean? Is there anything unusual about their order? (2)


b) What does the spiky shape of the graph indicate? Give a possible reason for why the consumption (in kWh) is high for some months and at zero for others. (3)


c) Can you see a pattern between the high points (spikes) on the graph and the number of months that has passed? What does this pattern suggest about how often Mr du Plessis' metre is read? (3)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Cell phone bills

Many different cell phone packages are available for pre-paid or contract accounts. You need to decide on your own needs, and then work out which account would be best for you.

# TAX INVOICE

MTN Service Provider (Pty) Limited  
 215 14th Avenue, Fairland, Roodepoort, 2195  
 Private Bag 9905, Cresta, 2118  
 MTN SP Reg. No.: 1993/002643/07  
 VAT Registration No.: 4130141247

**CUSTOMER CARE ENQUIRIES**  
 Tel: +27(0)83-1-808  
 Tel: 808 (free from MTNSP cellphone)  
 E-mail: mtmsp@mtn.co.za  
 Website: www.mtmsp.co.za

**Mr Rael Finlay**  
 Mr Rael Finlay  
 103 The Vines  
 Alphen Mill Road  
 MAYNARDVILLE  
 -  
 7834

<b>VAT REG. NO.:</b>		<b>INVOICE NO.:</b>	
<b>ACCOUNT NO.:</b>		<b>INVOICE DATE:</b>	
<b>CELLPHONE NO.:</b>		<b>NAME:</b>	

DATE	TRANSACTION	AMOUNT
20/03/2012	BLACKBERRY INTERNET SERVICE HIGH	51.73
20/03/2012	BLACKBERRY SERVICE FEE DISCOUNT	-51.73
20/03/2012	CALL LINE IDENTITY MONTHLY FEE	7.02
20/03/2012	PROMO SERVICE FEE	86.84
20/03/2012	MTN 200 TopUp SUBSCRIPTION	175.44
20/03/2012	CLI MONTHLY DISCOUNT	-7.02

<b>TOTAL EXCLUDING VAT</b>	<b>262.28</b>
<b>VAT AT 14.00 %</b>	<b>36.72</b>
<b>TOTAL</b>	<b>R 299.00</b>

Unless a query is raised in respect of the contents of this bill within 30 days from the date thereof, the contents shall be deemed to be correct.

Dial \*141\*8 and this could be less  
 Join the MTN 4-4-1 Loyalty programme and you save on your monthly bill  
 Dial \*141\*9\*Your ID Number# from your phone or visit [www.mtn.co.za/loyalty](http://www.mtn.co.za/loyalty) to join for free.

**LAST SIX BILLING PERIODS**

11-2011	12-2011	01-2012	02-2012	03-2012	04-2012
R 298.00	R 299.00	R 299.00	R 299.00	R 299.00	R 299.00

<b>AVERAGE SPENT</b>	<b>R 315.50</b>
----------------------	-----------------

MTNSP Bank Details: ABSA Bank, Account No.: 4063304156, Branch Code: 632005  
 MTN SERVICE PROVIDER (PTY) LTD IS LICENCED AS A FINANCIAL SERVICE PROVIDER - Licence No: 23660

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Study the mobile phone invoice on the previous page.

- a) What is Mr. Finlay's cell phone number?
- b) What kind of cell phone do you think Mr. Finlay owns? Explain your answer.
- c) For which service did he receive a 100% refund? Explain your answer.
- d) Does Mr. Finlay receive any other discounts? If so, what were they?
- e) What is the most expensive item in the list of transactions? What do you think this amount is for?
- f) How do we know that Mr. Finlay has been an MTN client since at least November 2011?
- g) Can Mr. Finlay make calls to international numbers on his phone? Explain your answer.
- h) How many days does he have to query this invoice?
- i) MTN includes the average spent per month, over the last 6 months. Show how they calculate this average.
- j) Show how MTN calculated the 14% VAT that is added to the total excluding VAT.

### **Solutions**

- a) 081 423 7012
- b) The transaction column lists his phone as a Blackberry.
- c) The Blackberry Internet service (added and then subtracted)
- d) Mr. Finlay received a R7,02 discount for "CLI Monthly Discount".
- e) The most expensive item is "MTN 200 TopUp Subscription". This is the fixed amount that Mr. Finlay pays for his cell phone contract (an MTN TopUp 200 type contract) each month.
- f) The invoice includes Mr. Finlay's last 6 billing periods, the first of which is dated 11-2011.
- g) Yes. One of the "Additional Services" listed in the grey column on the left hand side of the page is "Allow International Dialling".
- h) Mr. Finlay has 30 days to query the invoice.
- i)  $\text{Average} = \text{Total amount over 6 months} \div \text{number of amounts}$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

$$= (398 + 299 + 299 + 299 + 299 + 299) \div 6$$

$$= 1\,893 \div 6 = R315,50$$


j) Total excluding VAT = R262,28

$$14\% \text{ of } R262,28 = R262,28 \times 14 \div 100 = R36,72$$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_


Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Cell phone bill**



**vodacom**

©1COM/204 / 01 / 0029905 / 041809 \*#



**L9243867-2**  
**OLIVER MICHAELS**  
**407 MONTFRERE**  
**1 CLAIR STREET**  
**WESTDENE**  
**BLOEMFONTEIN**  
**6523**

**Tax invoice**

Account number: **L9243867-2**  
 Date: **03/07/2012**  
 Your VAT registration number:

---

All data Contract customers on any data bundle will qualify for additional data to be used between midnight and 5am, e.g. if you have a MyMeg 250, you will get another 250MB of Night Owl. This offer excludes Top Up and Prepaid customers. T&Cs apply.

**Account summary:**

Date	Description	Item number	Reference	Amount	Total
04/06/2012	Balance Brought Forward			99.00	99.00
02/07/2012	Payment	SCZ1399663	159019663	-99.00	0.00
03/07/2012	Invoice	B227108838	726371238	99.00	99.00

**Invoice summary:**

Cellular number: **0731456720**  
 Invoice number: **B227108838**  
 Due date: **31/07/2012**

Description	Amount	VAT	Total
<b>Subscription Services</b>			
Data Promotion - Top Up MyGig1	July 86.84	12.16	99.00
HSDPA Voice Tariff	July 0.00	0.00	0.00
VAS - Balance Notification	July 5.70	0.60	6.50
VAS- Free Balance Notification	July -5.70	-0.60	-6.50
<b>Total Subscription Services</b>		<b>12.16</b>	<b>99.00</b>
<b>Subtotal</b>	<b>86.84</b>	<b>12.16</b>	<b>99.00</b>
<b>This Invoice amount</b>	<b>86.84</b>	<b>12.16</b>	<b>99.00</b>

>>> 9 2060 1903 149 721 9

**Invoice Total** **99.00**

Page 1 of 1

Your bank account will be debited with the full outstanding balance as reflected on this statement on the 1 August 2012  
 Vodacom (Pty) Ltd. Registered office: P O Box 3306 Craemview 2060. Company Registration No. 1993/003367/07. V A T Registration No. 401013921

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Oliver receives the cell phone bill on the previous page.

1. What is the balance brought forward from the previous invoice? (1)


2. On what date was the payment of this balance made? (1)

--

3. When is the payment for the current outstanding amount due? (1)

--

4. What subscription service does Oliver get for free? (1)

--

5. What subscription does Oliver get a full refund for? (1)

--

6. What is the billing period for this invoice? (1)

--

7. Oliver wants to query the last payment he made. List four things he could use as a reference number. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

8. Oliver wants to check that the VAT calculated on the total amount due is correct. Show how he can do this. Show all your calculations. (3)


[13]

**A budget is a plan for using income to cover expenses.**

Budgets, income and expenditure statements

table of some income and expenses

<b>Income</b>	<b>Expenses</b>
<ul style="list-style-type: none"><li>• Salary – monthly earnings from an employer</li><li>• Wages – weekly earnings from an employer</li><li>• Commission – money earned for selling</li><li>• Profit – extra money gained on sales of goods and services</li><li>• Gifts</li><li>• Financial assistance</li><li>• Rental income for a property</li></ul>	<ul style="list-style-type: none"><li>• Living expenses</li><li>• Accounts</li><li>• Telephone</li><li>• Insurance</li><li>• Personal taxes</li><li>• Loan repayments</li><li>• Savings</li><li>• Salaries and wages</li><li>• Business running expenses</li></ul>

Types of Income or Expenses:

- Fixed means it does not change with time.
- Variable means it changes over time, according to the situation.
- Occasional means it occurs from time to time.

There are several things you should aim for in your personal budget:

- It should list all of the items that are needed and should try to anticipate unforeseen expenses.
- It should be realistic, so that you can stick to it.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- It should focus on the high priority items (essential items such as food and health care). If too much of the income is spent on nonessential items and not on savings, your budget is going to become problematic in the future.
- An ideal budget should include a plan to save money for the future, or to pay off debts to allow for savings in the following months.
- It should be balanced. If your income is less than your expenses, then you need to revise it until the two sides balance. If your income is more than your expenses, then you should plan to save the extra money.

### Example

Douglas wants to travel from Cape Town to Durban to visit his cousin. His parents said that they can give him R500 towards the trip. He decides to draw up a budget to determine how much money the trip will cost. His uncle has offered to give him a lift home so he only needs to budget for the trip to Durban. He has R2 000 saved in his bank account. He wants to have some spending money left over when he gets there.

He phones Rainbow Buses to find out how much it costs to travel from Cape Town to Durban. They give him two options:

OPTION 1: Leave Saturday morning and travel straight to Durban. The trip costs R1 200 and he will need to pay for 3 meals at R30 per meal.

OPTION 2: Leave Saturday morning and travel to Plettenberg Bay first. The trip costs only R400. He can then catch a bus on Sunday morning to Durban. This bus trip will cost R500. If he does this he needs to find a place to stay on Saturday night and budget for three extra meals (estimated at R30 each). He estimates that a Backpackers' Lodge would be the cheapest place to stay, at R200 a night.

	Income	Expenses	running total of money that he has
Money from parents			
Savings			
Bus fare			
Meals on bus			
Accommodation			

a) Copy the above budget sheet and fill in the amounts for income and expenses in the correct columns for Option 1 and

Option 2.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

b) Would you advise Douglas to take Option 1 or Option 2? Explain your answer.

### Solutions

a) OPTION 1

	Income	Expenses	Running total
Money from parents	500		500
Savings	2 000		2 500
Bus fare		1 200	1 300
Meals on bus		$3 \times 30 = 90$	1 210
Accommodation		0	1 210

#### OPTION 2

	Income	Expenses	Running total
Money from parents	500		500
Savings	2 000		2 500
Bus fare		$400 + 500 = 900$	1 600
Meals on bus		$6 \times 30 = 180$	1 420
Accommodation		200	1 220

b) Although the bus fare for Option 2 was cheaper the costs are quite similar in the end.

Option 1 is much more convenient and is quicker, so he should choose this option.

### Exercise

#### Travel budgets

Consider the previous activity, where Douglas planned to travel to Durban. He eventually decided to travel to Durban using bus Option 1. He kept all the receipts and till slips so that he could write a statement to see how much money he actually spent. Read the summary below of Douglas's bus trip.

When Douglas arrives at the bus station to buy the ticket, he finds that the advertised price does not include VAT, and he needs to add 14% to the cost. To add to his problems, the bus breaks down and Douglas needs to find a place to stay the night in Knysna. He finds a backpackers' lodge that costs R200 a night for a shared room. He also needs to rent a locker for R20 to keep his luggage safe. Apart from three meals on the bus, he needs to buy an extra supper and breakfast, which cost him R30 each.

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1. Fill in a table like the one used for his budget, to show his actual expenses and the running total of expenses.

Expense description	Amount	Running total of expenses

2. What is the amount of money he ends up with as spending money in Durban?  
Remember: he had R2 500 to begin with.


A household has the following monthly expenses:

- rent R2 300
- transport R520
- cell phone R200
- pre-paid electricity R800
- water bill R350
- TV contract R250
- loan repayment R310
- furniture store account R570
- clothing store account R315
- groceries R2 500
- medical expenses R 75

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They live on the following monthly income: a state pension of R1 140, a disability grant of R1 140 and a salary of R5 250. This month, one of the children falls ill and they have additional medical expenses of R500 for doctor's visits and medication.

- Draw up an income and expense statement for the household for this month.
- What is the total difference between the income and expenses?
- Which costs could be reduced in their budget?
- If those costs were reduced, would the family have enough money to cover their expenses?

### Solutions

a)

	Income	Expenses
State Pension	1 140	
Disability grant	1 140	
Salary	5 250	
Rent		2 300
Transport		520
Cell phone		200
Pre-paid electricity		800
Water bill		350
TV contract		250
Loan repayment		310
Furniture store account		570
Clothing store account		315
Groceries		2 500
Medical expenses		75 + 500 = 575
Total	7 530	8 690

- $R8\ 690 - R7\ 530 = R1\ 160$  more for expenses than they receive in income.
- Water and electricity usage could be reduced, the furniture and store accounts could be paid off and closed, and grocery expenses could be reduced.
- Probably. They aren't thousands of rands over budget so a series of small reductions across their expenses would bring their expenses in line with their income.

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### Exercise

#### Family budget

Look at the family budget for the month of December 2013, for the Philander family. There are two adults and two school children in the family.

Item	Expenditure		Income
	Fixed	Variable	
Mrs Philander's salary			R9 500
Mr Philander's salary			1.
Additional income			2.
Bond repayment	3.		
Food		4.	
Edgars clothing account	5.		
School fees	6.		
Transport		7.	
Entertainment		8.	
Savings	9.		
Car repayment	R1 300		
Municipality rates	10.		
Electricity	R200	11.	
Vodacom contract cost	R700		
Total	?	?	?
Surplus or deficit?			

Complete the above family budget by using the following information.

1. Mr Philander's income: He works 20 days per month at a rate of R500 per day. (1)

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2. Additional income: Mr Philander owns additional property which he rents out to people at a fixed charge of R2 500 per month. (1)


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3. The monthly bond repayments are fixed at R5 550 per month. (1)


4. The average amount spent on food each month comes to R2 500. Mrs Philander believes that this should be increased by 10% due to recent food price increases. (1)


5. Mr Philander pays Edgars an amount of R800 per month. However, since he bought his children their school uniforms on account, he estimates that this amount will increase by a further 12%. (1)


6. The school fees are R1 200 per child per month. (1)


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7. Transport costs are as follows: For the children, taxi fare per child = R5,00 per trip to school and another R5,00 each for the trip home. There are 20 school days in a month. Mr Philander first drives his wife to work and then goes to work himself. In the evenings he picks her up and they drive home again. They both work 20 days per month. Mr Philander has noticed that his car uses an average of 4 litres of petrol per day each time he does this. On the other 10 days of the month, his car uses an average of 3 litres per day. The cost of petrol is R10,50 per litre. Calculate the total amount that should be budgeted for transport. (5)


8. The amount budgeted for entertainment is estimated at 5% of the combined income of Mr and Mrs Philander. (2)


9. Savings are currently 5% of Mrs Philander's income. (2)


10. The amount budgeted for municipal rates is 5% of the total income earned by the Philander household. (5)


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11. The fixed component of the electricity account is currently R200 per month. The variable component is calculated as follows: the average amount of electricity consumed by the Philander household is 550 kilowatt hours per month at a rate of R0,50 per kilowatt hour. (4)


12. Is the Philander family within budget? Explain your answer. (5)


[29]

### Banking, interest and tax

Banks offer different types of accounts and services.

- Savings account: A bank account that earns interest. You can use a savings account for short – term savings.
- Cheque or current account: A bank account that is used to deposit and withdraw money by visiting the bank branch, using an ATM or Internet banking or by writing a cheque. These are usually available to people who earn a regular income.
- Fixed deposit account: This account is aimed at those who have a lump sum they want to invest over a fixed period of time (i.e. a medium or long term saving). Interest is also earned on the investment.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- Credit account (with credit card): An account either with a store or bank, that allows the account holder to purchase items now and pay for them later.
- Debit account (with debit card): Debit cards can be used to pay for purchases. When it's swiped, money is deducted from the account. Credit is not available on this account.

### Bank statements

A bank statement is usually sent to the account holder monthly. Bank statements show the following for each transaction:

- the date of the transaction
- a description of the transaction, showing the type of transaction
- the amount of the transaction, indicating whether it is a debit or credit (often in different columns)
- a column for the balance after each transaction. Account holder: The person whose name the account is in. Opening and closing balance: The amount of money in the account at the beginning and the end of the period.

**transaction:** Any event where money moves into or out of an account.

**debit transaction:** Amount of money paid out of an account.

**Credit transaction:** Amount of money deposited into an account.

### Example

Xola receives the following statement from her bank, detailing her transactions from 25/01/2013 to 20/02/2013. Study the statement and answer the questions that follow.

Date	Description	Amount	Amount	Balance
25/01/2013	Salary	8 000,00		8 050,50
27/01/2013	Car insurance		-100,00	7 950,50
01/02/2013	Electronic transfer Mr. Serei (RENT)		-3 000,00	4 950,50
01/02/2013	Debit order Healthsaver medical aid		-500,00	4 450,50
02/02/2013	Debit order Mobi contract		-250,00	4 200,50
03/02/2013	Debit order Supa Fashion Store		-300,00	3 900,50
05/02/2013	Purchase at Shop 'n Save		-2 000,00	1 900,50
14/02/2013	PAYMENT Mrs. S Khumalo	500,00		2 400,50
20/02/2013	Automechanix		-1 000,00	1 400,50
Total remaining:				1 400,50

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- a) How can you tell the difference between the debits and the credits in this statement?
- b) List Xola's debits and credits for the month.
- c) In the first line of this statement, Xola receives a salary of R 8 000. Look at the balance and work out what she had in the account before the payment was made.
- d) Xola receives some birthday money as well as her salary this month. Identify and write down the birthday transaction.
- e) How much money would she have been left with on 20/02/2013, if she hadn't received money for her birthday?
- f) Xola wants to save 15% of her remaining money this month. How much can she save?

### Solutions

- a) The credits are positive values and are in the left-hand column, while the debits are negative and are in the right-hand column.
- b) Credits: Salary, deposit from Mrs S Khumalo. Debits: car insurance, rent, medical aid, cell phone contract, clothing store account, groceries, car repair.
- c)  $R\ 8\ 050,50 - R\ 8\ 000 = R\ 50,50$ , so she had R 50,50 in her account before her salary was paid.
- d) 14/02/2103 PAYMENT Mrs S Khumalo R 500.
- e)  $R\ 1\ 400,50 - R\ 500 = R\ 900,50$ .
- f)  $15\% \text{ of } R\ 1400,50 = 1400,50 \times 0,15 = R\ 210,08$ .

### Bank statements

Below is an incomplete bank statement for Koketso's savings account at the end of March

Date	Transaction	Payment	Deposit	Balance
27/02/2013	OPENING BALANCE			2 304,85
01/03/2013	INTEREST ON CREDIT BALANCE		13,95	
01/03/2013	CHEQUE (SALARY)		2 100,00	
01/03/2013	ATM CASH	400,00		
05/03/2013	ATM CASH	800,00		
10/03/2013	ATM DEPOSIT		600,00	
22/03/2013	SPENDLESS DEBIT CARD PURCHASE	235,95		

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1. How can you tell the difference between the debits and the credits in this statement? (2)


3. Copy Koketso's statement and complete the balance column as a running total. (6)


4. What is Koketso's balance on the 22nd of March? (1)

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4. Koketso aims to keep a minimum balance of R2 500 in his account to earn interest. Is he succeeding? (1)


[10]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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Example

Arthur's bank, Egoli Bank lists the following banking fees. Arthur subscribes to self-service banking and pays a monthly maintenance fee. In the space of a month Arthur performs the following transactions:

TRANSACTION	FEE
<b>MONTHLY FEES</b>	
Monthly maintenance fee	R5,00
Self-service banking subscription fee	R15,00
<b>DEPOSITS</b>	
Cash (over the counter/at Egoli Bank ATM)	R5,00
Cheque (over the counter/at Egoli Bank ATM)	Free
<b>CASH WITHDRAWALS</b>	
Over the counter	R10,00
Egoli Bank ATM	R5,00
Another bank's ATM	R7,00
Tillpoint - cash only	R1,00
Tillpoint - cash with purchase	R2,00
<b>ACCOUNT PAYMENT AND PURCHASES</b>	
Electronic transfers between accounts	Free
Electronic account payment	Free
Stop order	R5,00
Debit order - internal	R2,50
Debit order - external	R5,00
<b>BALANCE ENQUIRIES</b>	
Over the counter	First free per month, then R10,00
Egoli Bank ATM	First free per month, then R1,00
Another bank's ATM	R2,00
Self-service banking	Free

- He deposits R335,00 in cash at an Egoli Bank ATM.
- He withdraws R500 cash at another bank's ATM.
- He withdraws R100 cash over the counter at an Egoli Bank branch.
- He enquires twice about his balance, over the counter at an Egoli branch.
- He draws cash, whilst buying groceries at a till point at his local supermarket.
- He makes 3 electronic account payments to pay his rent, electricity and phone bill.

1. Calculate the total bank charges for these transactions.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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2. Arthur has a balance of R650 in his bank account at the end of the month.
  - (a) Calculate the ratio of the total bank fees to the month end balance.
  - (b) Express this ratio as percentage. (Round off your answer to 1 decimal place.)
3. Suggest ways in which Arthur could reduce his banking fees.

### Solutions

1. R5,00 (Monthly maintenance fee) + R15,00 (self-service banking) + R5,00 (cash deposit at Egoli bank) + R7,00 (cash withdrawal at other bank) + R10,00 (cash withdrawal over the counter) + R0,00 (first balance enquiry) + R10,00 (second balance enquiry) + R2,00 (till point cash withdrawal) + (3 × R0,00) (free electronic account payments) = R54,00.

2. (a) Banking fees: closing balance = 54 : 650 or 27 : 325

(b)  $54 \div 650 \times 100 = 8,3\%$  or  $27 \div 325 \times 100 = 8,3\%$

3. Arthur could withdraw cash at Egoli Bank ATM's only, not at other banks' ATM or over the counter at a bank branch. He could ask for a balance enquiry from an Egoli ATM, or via self-service banking, instead of over the counter. He could withdraw cash only at a till point, without purchasing anything.

### Exercise

#### Calculating banking fees

Mia has recently opened a Global account at Capital Bank. She is concerned about her monthly bank charges. Use the provided brochure and list of her account activities for the month of April to answer the questions below.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Date	Activities	Amounts
01 April 2013	Balance of previous month carried forward	R210,25
01 April 2013	Old Mutual Policy x74534: Debit order returned: insufficient funds*	R254,39
01 April 2013	Balance enquiry (mobile)	R0,00
02 April 2013	Davidsons Textiles: Salary deposit*	R450,00
02 April 2013	Shoprite Purchases: debit card*	R847,21
02 April 2013	Shoprite: Cash withdrawal*	R250,00
07 April 2013	Old Mutual Policy x74534: Branch Payment	R254,39
15 April 2013	Edgars: Purchases: Debit card*	R149,59
20 April 2013	Capital Bank ATM Withdrawal: *	R200,00
23 April 2013	Shoprite: municipal account payment*	R639,00
28 April 2013	FNB ATM withdrawal*	R500,00
29 April 2013	Balance statement at the branch	R3,00
30 April 2013	Monthly admission fee	R4,50

TRANSACTION	FEE
<b>Monthly fees</b>	
Monthly administration fee	4.50
Mobile banking subscription	FREE
Internet banking subscription	FREE
<b>Cash withdrawals</b>	
Supermarket tillpoints	1.00
Capital bank ATM	4.00
Other ATM	7.00
<b>Balance enquiries</b>	
Mobile banking	FREE
Cashier	FREE
Capital Bank ATM	FREE
Other ATM	4.00
<b>Transfers/Payments/Purchases</b>	
Debit card purchase	FREE
Debit order/recurring payment at branch	3.00
Debit order/recurring payment with internet banking	1.50
Payment to other Capital Bank account at branch	3.00
Payment to other Capital Bank account with internet banking	1.50
<b>Other</b>	
SMS notification	0.40
Statement in branch	3.00
Create, change or cancel recurring payment at branch	4.00
Returned debit order/recurring payment (stop order)	4.00
Returned early debit order	FREE
Insufficient funds (other ATM)	4.00

\*denotes SMS notification for April

1. How many withdrawals did Mia make during this month? (1)


2. Calculate the amount of money that was spent on monthly shopping purchases. (1)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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3. Use the relevant resources to calculate the amount of bank fees that Mia will pay for April. (9)


4. Suggest how Mia can further reduce her banking charges. (3)


[14]

## Simple interest

**interest rate:** A percentage charged for the borrowing, or loan, of a sum of money over a given period of time.

**interest:** The amount of money that you are charged (by the lender of money, e.g. the bank) for borrowing an amount of money, over a period of time.

Simple interest is calculated on the original amount, and is the same each time it is paid.

### Calculating interest amounts and interest rates

If we know what the interest rate is, we can calculate the interest value quite simply. For example, 10% interest on R3 500 =  $R3\ 500 \times 10\% = R350$ . So the interest amount is R350 and the total amount is  $R3\ 500 + R350 = R3\ 850$ .

If you are given the final amount, then you follow these steps to find the interest rate:

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- Find the difference between the final amount and the original amount: this gives you the amount of interest.
- Work out what percentage the amount of interest is of the original value, or of the amount owed (in hire purchase).

### Example

You see an advert for a wall unit. The cash price of the wall unit is R6 499,99.

Alternatively, you could choose to buy it on hire purchase and pay for it in instalments

over 3 years. If you choose to pay it off in instalments, you will pay interest every month on the wall unit.

- Calculate what the wall unit will cost if you pay a cash deposit of R650, and 36 monthly instalments of R449 each. (The total = cash deposit + 36 monthly instalments.)
- Calculate how much interest you will pay in total (in Rands) if you pay off the wall unit in instalments. (Hint: Interest amount = total payments – cash price.)
- Calculate the interest rate. (Interest rate = (Interest ÷ money owed) × 100).
- Do you think it is better to save up and buy the wall unit at the cash price, or pay it off over 3 years? Explain your answer.

### Solution

a) Total = cash deposit + 36 monthly instalments = R650 + (R449 × 36 months)  
= R16 814.

b) Interest = total payments – cash price = R16 814 – R6 499,99 = R10 314,01.

c) You owe R6 499,99 – R650 = R5 849,99. Interest rate = (R10 314,01 ÷ R5 849,99) × 100 = 176,3% over 3 years which is 58,8% per annum.

d) It is much cheaper to save up and buy the wall unit at the cash price. Over three years, the total amount you would pay in instalments is almost three times the cash price.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

#### Simple Interest

You found the following advertisement in a local newspaper. Answer the questions below.

**ON SALE!**

**Limited stocks in  
five different  
colours!**



40-inch Plasma TV set  
Cash price: R15 600  
Or: monthly instalments of  
R356,24 over 5 years  
Deposit: R1 560

1. Does the advertisement indicate the percentage of interest that will be charged if the TV is not paid for in cash? (1)

2. What will the balance be once the deposit has been paid? (4)

3. Will the interest be charged on the full purchase price or on the balance? (1)

4. How much will the instalment be per month? (1)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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5. How much will you have to pay for the TV in total? Use the formula:

$$\text{Total to be paid} = \text{Deposit} + (\text{Instalment} \times \text{number of instalments}) \quad (6)$$


6. How much interest (in Rands) will you have paid once you have completed paying off the TV? Use the formula:

$$\text{Interest} = \text{Total paid} - \text{cash price.} \quad (3)$$


7. What simple interest rate per annum will you be paying on the outstanding balance? (4)


[20]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Compound interest

hint

- Compound interest is calculated on the current balance.
- It yields more interest over time than simple interest.

### Example

Mr. Moloke has two options for borrowing money.

- a) His uncle has offered to lend him R16 000 for five years at 18% per annum, simple interest.
- b) His personal bank will lend him R16 000 for five years at 16% interest compounded per annum.

Determine the cost of the two options to recommend which one would be best for Mr. Moloke.

### Solutions

a) Simple interest =  $R16\,000 \times 18 \div 100 \times 5 = R14\,400$

Total amount =  $R14\,400 + R16\,000 = R30\,400$

b) Compound interest

First year =  $R16\,000 \times 16 \div 100 = R2\,560$

Total =  $R2\,560 + R16\,000 = R18\,560$

Second year =  $R18\,560 \times 16 \div 100 = R2\,969,60$

Total =  $R2\,969,60 + R18\,560 = R21\,529,60$

Third year =  $R21\,529,60 \times 16 \div 100 = R3\,444,74$

Total =  $R3\,444,74 + R21\,529,60 = R24\,974,34$

Fourth year =  $R24\,974,34 \times 16 \div 100 = R3\,995,89$

Total =  $R3\,995,89 + R24\,974,34 = R28\,970,23$

Fifth year =  $R28\,970,23 \times 16 \div 100 = R4\,635,24$

Total =  $R4\,635,24 + R28\,970,23 = R33\,605,47$

Therefore the personal loan is cheaper.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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## Loans

People borrow money when they need it most and they have to pay interest on the borrowed amount.

### Example

The table below is an extract from a letter from Sanlam to Mr. Moloke. It shows the amounts that are available on instant loan from Sanlam and the repayment involved.

Dear Mr. Moloke

As a valued customer, we are pleased to be able to offer you a personal loan at the following rates.

Loan amount	24 months	36 months	48 months	60 months
R4 000	R229	R174	R147	R131
R8 000	R448	R338	R285	R253
R16 000	R864	R643	R534	R470
R25 000	R1 344	R1 000	R830	R730

These loan repayments include a monthly premium of R3,95 per R1 000 of the loan and a monthly administration fee of R9,50 for your optional personal protection plan.

Answer the following questions.

If Mr. Moloke chooses to borrow R16 000 from Sanlam, calculate how much he will finally repay if he takes the loan over:

- a) 24 months
- b) 60 months.

Do you advise him to borrow for a longer or shorter time?

### Solutions

a)  $24 \times R864 = R20\ 736$

b)  $60 \times R470 = R28\ 200$

Borrowing for a short time involves less interest.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Exercise

### Loans

Mosima wants to buy an LCD TV and saw it advertised at R25 000. She does not have enough money to pay cash for the TV, so she has the option of either taking a loan from a microlender or paying by means of an instalment sale (hire purchase) agreement.

Suppose Mosima borrows R25 000 from a microlender to pay for the TV. The amount she has to repay every month depends on the length of time she takes to repay the loan.

The table below shows the different options she can choose from.

	Number of monthly Instalments				
	12	18	24	36	42
<b>Loan amount</b>	R25 000	R25 000	R25 000	R25 000	R25 000
<b>Initiation Fee</b>	R1 140	R1 140	R1 140	R1 140	R1 140
<b>Monthly Admin. Fee</b>	R57	R57	R57	R57	R57
<b>Monthly Instalment</b>	R2 283	R1 875	R1 562,50	R1 145,83	A
<b>Total Amount paid by the end of loan period</b>	R29 220	R35 916	R40 008	R44 441	R48 534,06

### Note

- An initiation fee is the amount charged by the microlender to process the loan application and is payable when the loan has been approved.
- A monthly instalment is the amount paid monthly.
- A monthly administration fee is an additional cost that is added to the monthly instalment.
- The total amount to be repaid = Initiation fee + [no. of instalments × (monthly instalment + admin fee)].

1. Use the formula to calculate the missing value A. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2. Suppose Mosima chose to repay the loan over 42 months. How much will the loan cost her in total? (1)

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3. If she buys the TV at R25 000 by means of an instalment sale agreement, she must first pay a 10% deposit, and then pay off the balance owing in equal instalments over 24 months at 33% per annum simple interest. Calculate the amount she has to pay for the deposit. (1)


4. Calculate the amount she is required to pay for her equal monthly instalments. Use the formula:

$$(\text{balance owing} \times \text{interest} \times \text{no. of years}) \div 24. \quad (2)$$


5. Calculate the total cost of the TV if she used this method of payment. (3)


6. Mosima decides that she wants to pay for the TV over a period of 24 months. Why? (1)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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## Inflation

Inflation is the increase of the price of a typical basket of goods and services calculated over a period of time. Inflation rate is calculated as a percentage.

### Example

a) A litre of milk currently costs R9,11. The expected inflation rate for 2015 will be 6,5%. What will the price of the milk be in 2015?

### Solution

New price will be =  $9,11 + 6,5\% \times R9,11 = 9,11 + (6,5/100 \times 9,11)$

$$= 9,11 + 0,6$$

$$= R9,71$$

b) The price of Nike shoes in 2014 is R650,95. What was the price of Nike shoes in 2013, if the inflation rate for 2013 was 6,4%?

### Solution

Solution

Inflation value =  $650,95 \times 6,4/106,4 = R39,15$

Therefore, Previous price

$$= R650,95 - R39,15 = R611,80$$

OR

Previous price + 6,4% = R650,95

Prev. price + (prev. price  $\times$  0,064)

$$= R650,95$$

Prev. price (1 + 0,064) = R650,95

Prev. price =  $R650,95 \div 1,064$

$$= R611,80$$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

b) A box of jungle oats increases in price from R17,99 to R19,99. Calculate the inflation rate for this period. Use the formula:

$$\text{Inflation rate} = \frac{\text{current price} - \text{previous price}}{\text{previous price}} \times 100$$

### Solution

$$\begin{aligned} \text{Inflation rate} &= \frac{R19,99 - R17,99}{R17,99} \times 100 \\ &= 11,1\% \end{aligned}$$

### Exercise

#### Inflation

1. A bar of soap currently costs R8,51 in 2014. The expected inflation rate for 2015 will be 6,3%. What will the price of the soap be in 2015? (2)


2. The price of a dress is R1 300,95 in 2014. What was the price of the dress in 2013, if the inflation rate for 2013 was 6,5%? (4)


3. A set of chairs increases in price from R17 355,75 to R19 943,99. Calculate the inflation rate for this period. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4. In November 2009 Statistics SA announced that the annual inflation rate was 5,8%.

a) Determine the price of a bicycle in November 2008 if it cost R1 586,95 in November 2009. (4)


b) Calculate the projected cost of a loaf of bread in November 2014 if it cost R5,45 in November 2008. Assume that the annual inflation rate remained at 5,8% over the given period. You may use the formula

$$A = P(1 + i)^n \quad (2)$$

where

A = the projected cost

P = current cost.

i = the annual inflation rate.

n = number of years.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Break-even analysis

### Small business

#### LEARNER NOTES:

- When you run a small business, you must be able to calculate the **number of items** you need to sell in order to make a profit.
- **INCOME** is the money generated by selling the product.
- **COST** is calculated by adding the operating costs and production costs together.
- Two graphs are drawn on the same grid, the point where these two lines intersect is called the **BREAK-EVEN POINT**.
- You must be able to read the profit or loss from the graph

#### TYPICAL EXAM QUESTIONS

John manufactures sandals using old tyres and tyre tubes. He decides to sell his product at an informal Sunday Market.



To rent space at the market costs John R80 per day. The production costs of one pair of sandals come to R70. John wants to sell the sandals at R90 per pair.

- I. Complete the following tables for INCOME and COSTS for John's sandal business.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**On ANNEXTURE A**

<b>COSTS</b>					
Number of Sandals (pairs)	0	1	5	10	20
Amount	Do on annexure	150	430	780	Do on annexure

<b>INCOME</b>					
Number of Sandals (pairs)	0	1	5	10	15
Amount	Do on annexure	90	450	900	Do on annexure

1.2 Use the information on the tables to draw line graphs for COSTS and INCOME on the grid on ANNEXTUE A. Label the lines. (6)

1.3 What is the point of intersection of the graphs called? (1)


1.4 What is the importance of this point of intersection in this case? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.5 How many pairs of sandals must John sell to start showing a profit? (2)


1.6.1 Show on the grid, where the profit on 17 pairs of sandals can be determined.

(2)


1.6.2 Calculate, by using the graph, the profit on 17 pairs of sandals. Show calculations. (3)


## ANNEXTURE A

1.1

### COSTS

Number of Sandals (pairs)	0	1	5	10	20
Amount		150	430	780	

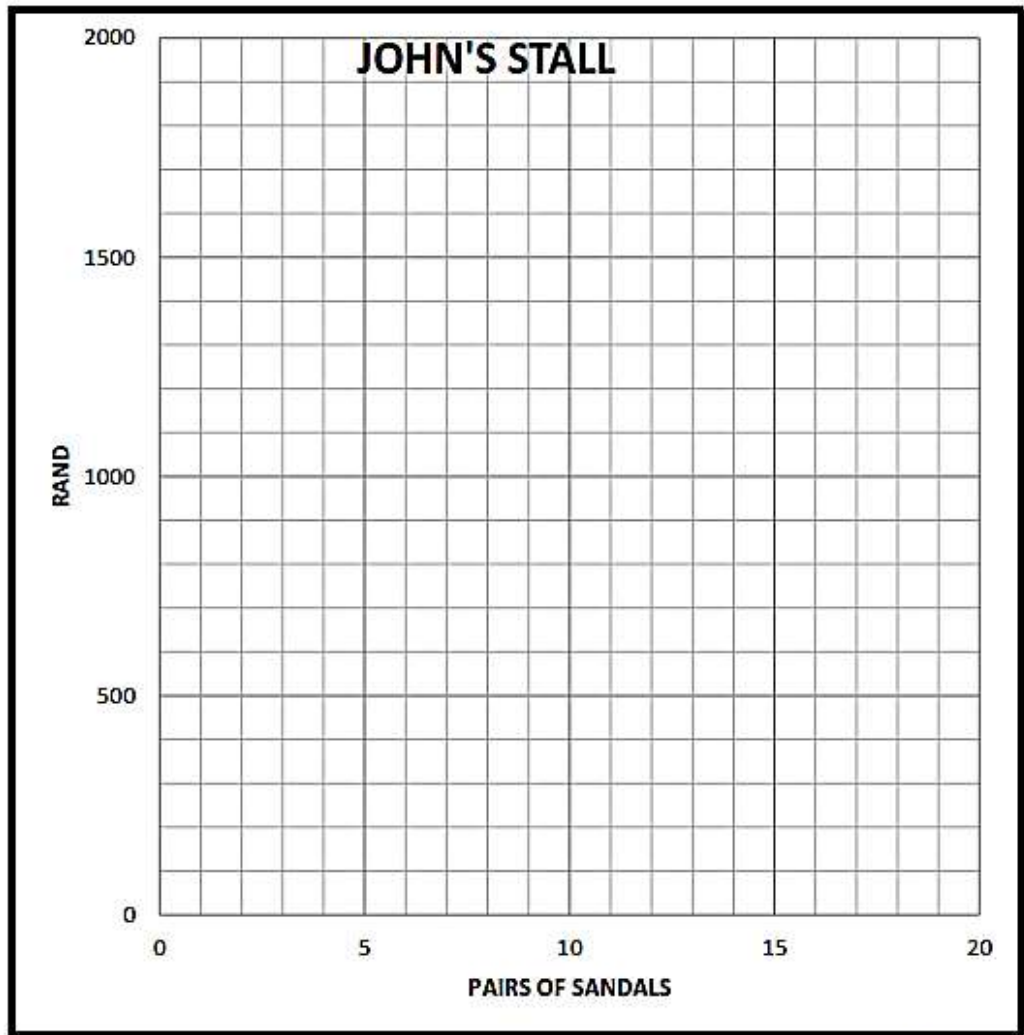
### INCOME

Number of Sandals (pairs)	0	1	5	10	15
Amount		90	450	900	

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2



[20]

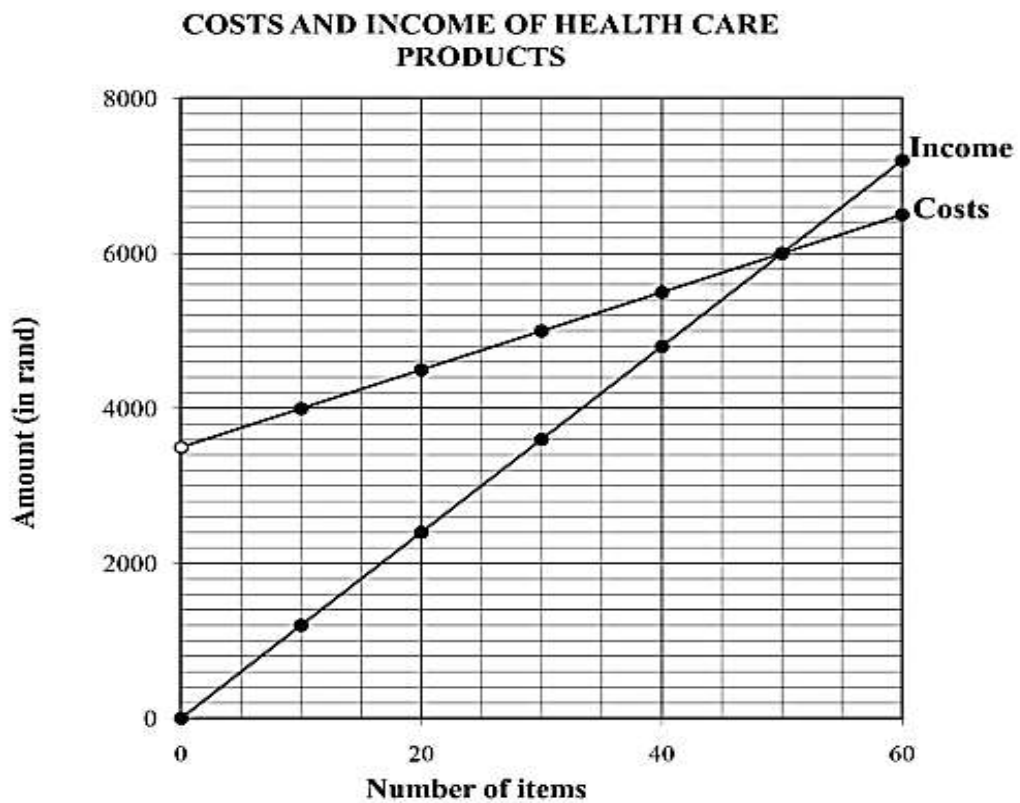
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Question 2

Mr Stanford owns a company that sells health care products. The company pays R50 per item plus R3 500 for shipping and packaging. They sell the items at R120 each.

The graph below shows the company's costs and income according to the number of items sold.



2.1 Use the graph above to determine the exact number of items sold that will give a loss of R1 400. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2 Mr Stanford stated that the company would break even if 40 items were sold at R137,50 each. Verify whether Mr Stanford's statement is correct or not. Show ALL the necessary calculations. (4)

[7]


**QUESTION 3:**

The Hospitality Studies department of Ses'fikile High School bakes brown bread in order to raise funds for the shortfall incurred in their day-to-day expenses.

The school charges the Hospitality Studies department a fixed weekly cost of R400,00 for water and electricity

The cost of producing one loaf of brown bread, including labour and ingredients, is R3,50. The brown bread is sold at R6,00 a loaf.

3.1 If one loaf of brown bread requires 450 g of flour, determine the maximum number of loaves of brown bread that can be baked from a 12,5 kg bag of flour. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.2 The table below shows the weekly cost of making the bread.

**TABLE 1: Weekly cost of making brown bread**

<b>Number of loaves</b>	0	40	80	120	160	<b>B</b>	
							300
<b>Total cost (in rand)</b>	400	540	680	<b>A</b>	960	1 240	1 450

The formula used to calculate the total cost per week is:

**Total cost per week = Fixed weekly cost + (number of loaves of bread × cost per loaf)**

Use the given formula to determine the values of **A** and **B** in TABLE 1. (4)

3.3 The table below shows the weekly income from selling the bread.

**TABLE 2: Weekly income received from selling bread**

<b>Number of loaves</b>	0	40	120	150	<b>D</b>	250	300
<b>Total income (in rand)</b>	0	240	<b>C</b>	900	960	1 500	1 800

Determine the values of **C** and **D** in TABLE 2. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.4 Use the values from TABLE 1 and TABLE 2 to draw TWO straight line graphs on the same grid using ANNEXURE A, showing the total **COST** per week of making bread and the **INCOME** per week from selling bread. Clearly label the graphs '**COSTS**' and '**INCOME**'. (8)

3.5 Use the tables or the graph drawn on ANNEXURE A to answer the following questions.

3.5.1 How many loaves of bread must they sell to break even and describe what is happening at the break-even point? (3)


3.5.2 What income would they receive if 230 loaves were sold? (2)


3.5.3 Estimate the number of loaves baked if the total cost is R840. (2)


3.6 Determine, by calculation, whether Ses'fikile High School will make a profit or a loss if they bake 300 loaves of bread during the week, but only sell 250 of these loaves of bread. (5)

**[32]**


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Follow these steps when doing break-even point questions:**

- (1) Summarise the situation
- (2) Formulate equations for cost and income
- (3) Complete the table
- (4) Draw the graphs using the table
- (5) Analyse the graph

The graphs are always straight lines, BUT in the second homework question you will find a line that is not completely straight.

Look out for questions which ask: "How many products must be sold to start showing a profit." The answer is NOT the break-even point, but actually the first integer AFTER the break-even point.

**START-UP COSTS:** Costs that need to be paid before the business starts to operate, eg: stoves, fridges (small bakery); welding machine (burglar bar business).

**OPERATING COSTS:** Costs that the business has to pay regularly while the business is operating.

**PRODUCTION COSTS:** Costs that result directly from the production or supply or service.

**BREAK-EVEN POINT:** Where income and costs are equal for a certain number of products.

**PROFIT:** When the income is higher than the costs. (higher than the break-even point)

**LOSS:** When the costs are higher than the income (the break-even point is not reached yet).

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

#### Question 1

Mrs Maharaj makes duvet sets, which she sells at the local street market at R150,00 per set (including VAT).

- If she makes 50 or less duvet sets per month, her production costs are R100,00 per set.
- If she makes more than 50 duvet sets per month, her production costs are reduced by 15% per set.

Mrs Maharaj has to pay R8 400 annually for the rental of her stall and she has weekly transport costs of R75

. 1.1 Mrs Maharaj prepares a monthly budget.

1.1.1 Show that her fixed cost for the month of February is R1 000,00. (2)


1.1.2 How does her fixed cost for February compare to her average monthly fixed costs? Show ALL calculations. (5)


1.2 Calculate the production cost per duvet set if 90 sets are made per month. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.3 The table below shows Mrs Maharaj's production cost for different quantities of duvet sets made in February.

**TABLE 3: Cost of duvet sets made in February**

Number of duvet sets	0	30	50	51	56	60	70	D
Total cost per month (in rand)	1000	4000	6000	5335	5760	6100	C	7800

The formula used to calculate the total cost is:

$$\text{Total cost} = \text{fixed monthly cost} + (\text{number of duvet sets} \times \text{cost per set})$$

Use the formula and the given information to determine the missing values **C** and **D**.  
(5)


1.4 Mrs Maharaj draws two graphs to represent her income and expenses for different quantities of duvet sets. The graph showing her INCOME for different quantities of duvet sets has already been drawn on ANNEXURE A. Use the values from TABLE 3 to draw a second graph on ANNEXURE A showing the total EXPENSES for February of making different quantities of duvet sets. Label the graph as 'EXPENSES'. (7)

1.5 Use the two graphs to answer the following questions:

1.5.1 How many duvet sets must Mrs Maharaj sell to break even? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.5.2 What profit will she make if all 80 duvet sets are sold? (3)

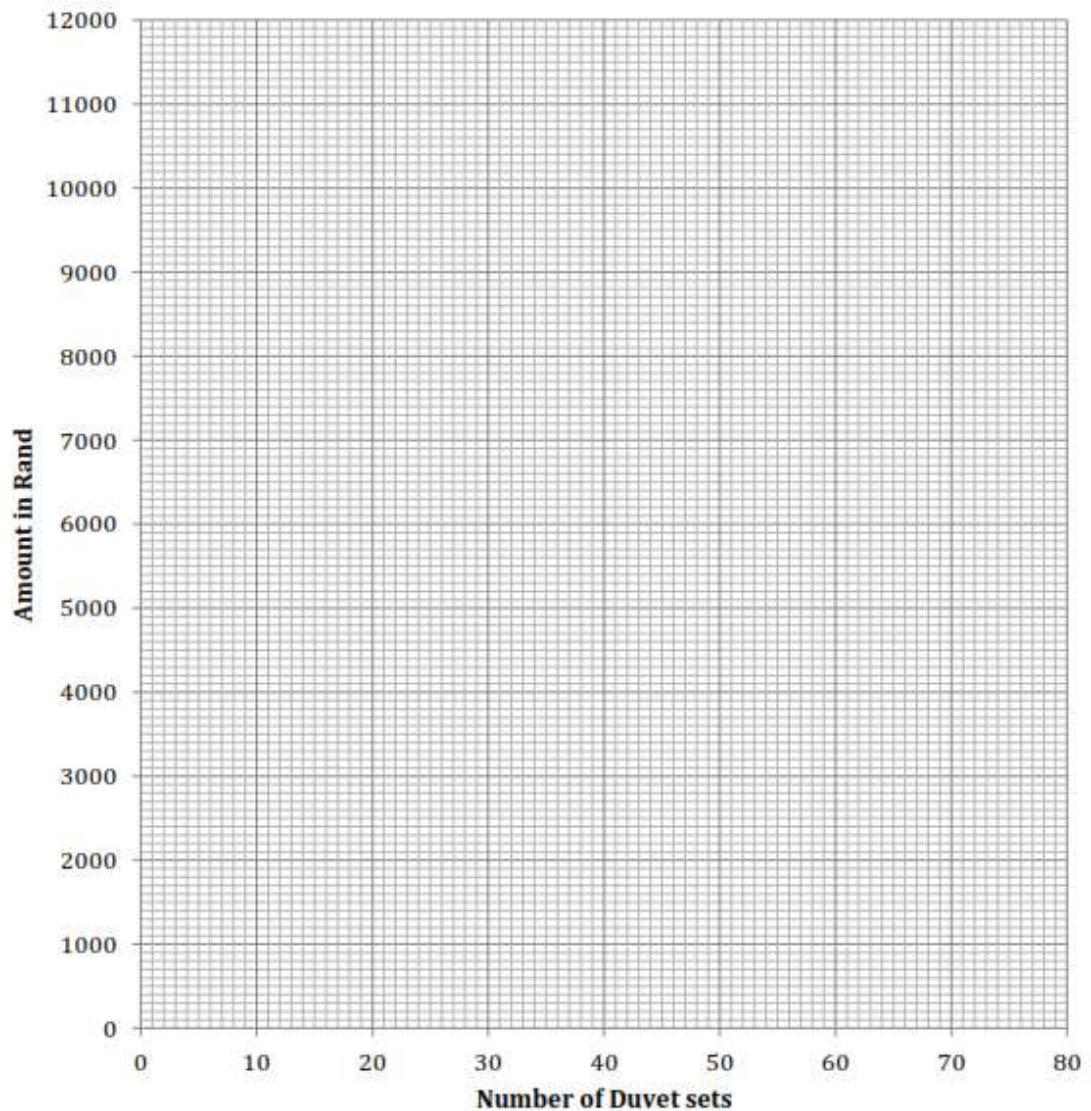

1.5.3 Suppose Mrs Maharaj makes 80 duvet sets, but only sells 70 of them. Calculate her profit for February. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXTURE A

## INCOME AND EXPENSES



Mrs Louw bought a knitting machine for R5 600,00 to make the jerseys. It will cost her an average of R60,00 (including wool and electricity) to make one longsleeved jersey (irrespective of the jersey size). The school shop buys a longsleeved jersey for R95,00 and then sells it to the learners.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

TABLE 4 below shows the relationship between the costs and income for making and selling 200 long-sleeved jerseys.

**TABLE 4: Costs and income for making and selling 200 long-sleeved jerseys**

	NUMBER OF JERSEYS MADE						
	0	60	A	120	160	180	200
Costs (in rand)	5 600	9 200	11 600	12 800	15 200	16 400	17 600
Income (in rand)	0	5 700	9 500	11 400	15 200	B	19 000

1.3 Determine the missing values **A** and **B**. (4)


1.4 On ANNEXURE B, the line graph showing Mrs Louw's income from the sale of 200 long-sleeved jerseys is drawn. Draw another line graph on the same grid representing the costs of making 200 long-sleeved jerseys. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.5. Determine the minimum number of jerseys Mrs Louw should make and sell to start showing a profit. (2)


[10]

**Question 2**

AA High School is considering renting a photocopier. They approach two companies(Company A and Company B) and obtain the following quotations:

**Company A:**

Rental of R800,00 per month, which includes 3 000 free copies per month. Thereafter a charge of 5 cents per copy applies.

**Company B:**

Rental of R600,00 per month, which includes 2 500 free copies per month. Thereafter a charge of 10 cents per copy applies.

**TABLE 3: Monthly cost (in rand) of renting a photocopier**

Number of copies made	0	2 000	2 500	3 000	4 000	6 000	7 000	8 000
Company A	800	800	800	800	Q	950	1 000	1 050
Company B	600	600	P	650	750	950	1 050	1 150

2.1 Determine the missing values **P** and **Q**. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2 Write down a formula that can be used to calculate the total cost per month of renting a photocopier from Company B. (3)


2.3 The line graph illustrating the total rental cost for Company B has been drawn on ANNEXURE B. On the same system of axes, draw a line graph to illustrate the total rental cost for Company A. (4)

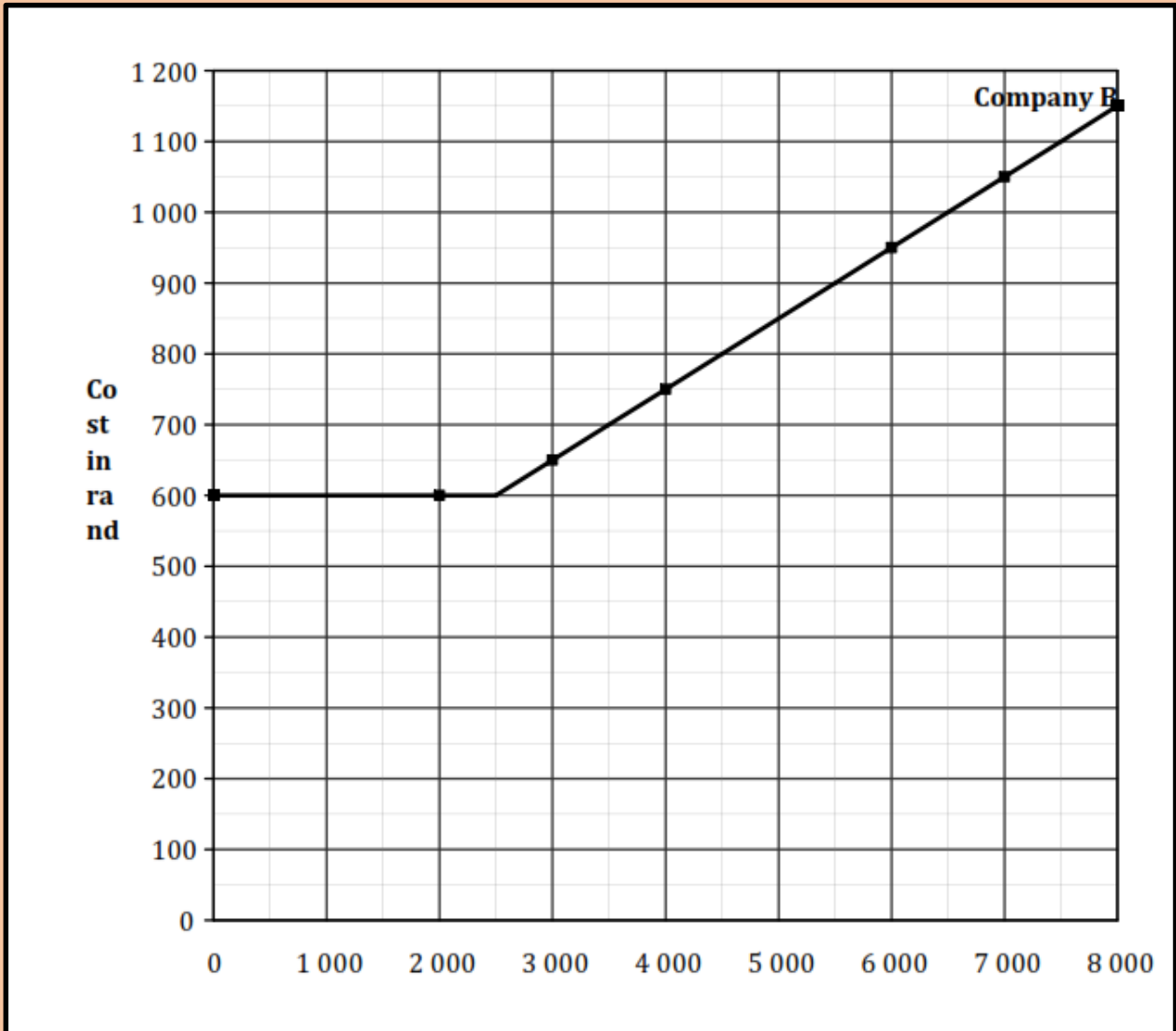
2.4 Determine the number of photocopies made if the total rental cost for both companies is the same. (2)


2.5 AA High School makes an average of 7 000 photocopies per month. Calculate how much the school will save by choosing the cheaper rental option and identify the company that charges the lower total rental cost. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXTURE A



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

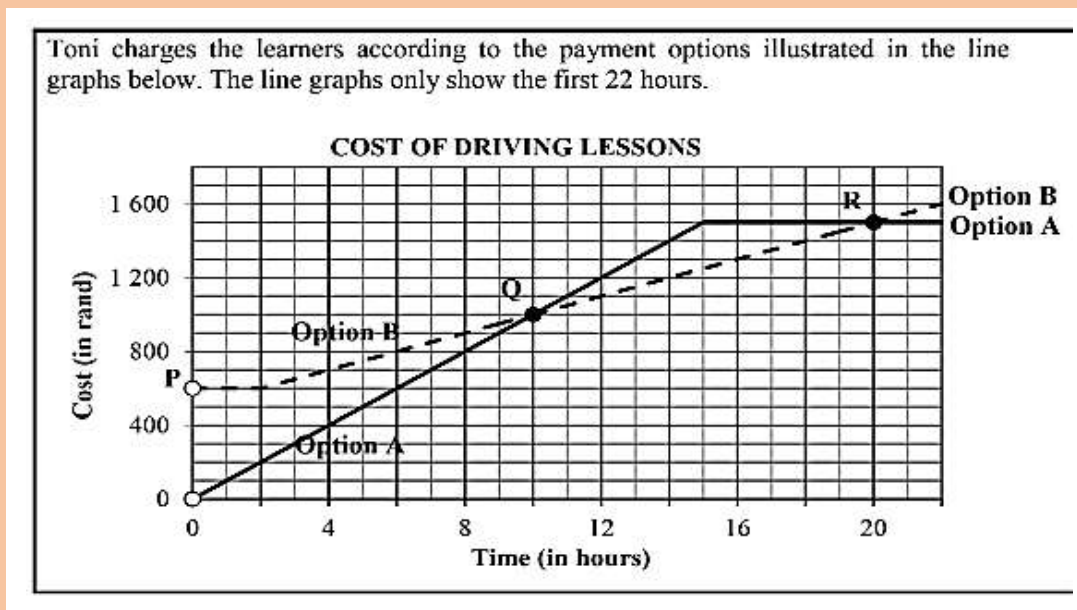
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## FINANCES: TARIFF SYSTEMS

- ✓ One often has to make choices between different tariff systems to live economically.
- ✓ By using graphs you can easily SEE which choice to make.
- ✓ These graphs are similar to the INCOME and COST graphs of session 2, BUT now you are not determining profit or loss of a business, you are now using the graphs to find the BEST OPTION for yourself..
- ✓ You will draw two or MORE graphs on the grid, and where these lines INTERSECT, (the break-even points for the 2 lines involved), the situation depicted by the graphs has a “change”.
- ✓ Using this method you can determine which investment is the best, OR which cell phone contract is the best etc

### Exercise

#### Question 1:



1.1 Interpret the horizontal part of the line graph for Option A (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2 Payment Option B starts at point **P**.

(a) Explain why point **P** is represented by an open circle on the graph. (2)


(b) Describe in detail the cost of driving lessons if option B is used. (3)


1.3 The graphs intersect at points **Q** and **R**. Interpret the graphs at point **Q**. (2)


1.4 Zaheera budgeted R1 200 for her driving lessons. Explain which option would be better for:

(a) Zaheera (2)


(b) Toni (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.5 In an attempt to further reduce the total cost of her driving lessons, Zaheera asks a friend to teach her some basic driving skills. After a series of free lessons with her friend, she realises that she only requires 6 hours of lessons from a driving school. Identify the option she should now choose. Explain your answer. (3)


1.6 Calculate the difference in cost for a learner using OPTION A and another learner using OPTION B if they both require 30 hours of lessons. (5)


[28]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Question 2

Nandi is considering changing her hairstyle and visits a local hair salon to determine the cost of styling her hair. She has a choice between hair extensions or hair relaxing.

The pictures below compare relaxed hair and hair extensions.



The cost of the two choices is shown below.

COST OF HAIR RELAXING	COST OF HAIR EXTENSIONS
R140,00 per treatment, including moisturising gel and one hair wash	R500,00, including one hair wash
Weekly hair wash at R40,00, including moisturising gel	Weekly hair wash at R40,00
Treatment must be repeated every four weeks or monthly.	Extensions last for 6 months or 24 weeks.

formula:

**Cost for the first four weeks (in rand) = 40 + (3 × cost of a hair wash)**

2.1 Calculate the cost of hair extensions for the first four weeks. Use the formula: **Cost for the first four weeks (in rand) = 500 + (3 × cost of a hair wash)** (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2.

Nandi wants to convince her father that in the long run, the cost of hair extensions will be cheaper than the cost of hair relaxing.

The accumulated cost for each choice over a 37-week period is given in the table below.

**TABLE 3: Comparison of accumulated costs after the first week of each month**

Time period (in weeks)	1	5	B	21	25	29	37
Accumulated cost of hair relaxing (in rand)	140	A	920	1 440	1 700	1 960	2 480
Accumulated cost of hair extensions (in rand)	500	660	980	1 300	1 920	2 080	2 400

a) Calculate the missing values **A** and **B**. (4)


b) Which hairstyle will be cheaper over the first 21 weeks? (2)


c) Calculate how much more Nandi will pay over a 37-week period for relaxing her hair compared to wearing hair extensions. (2)

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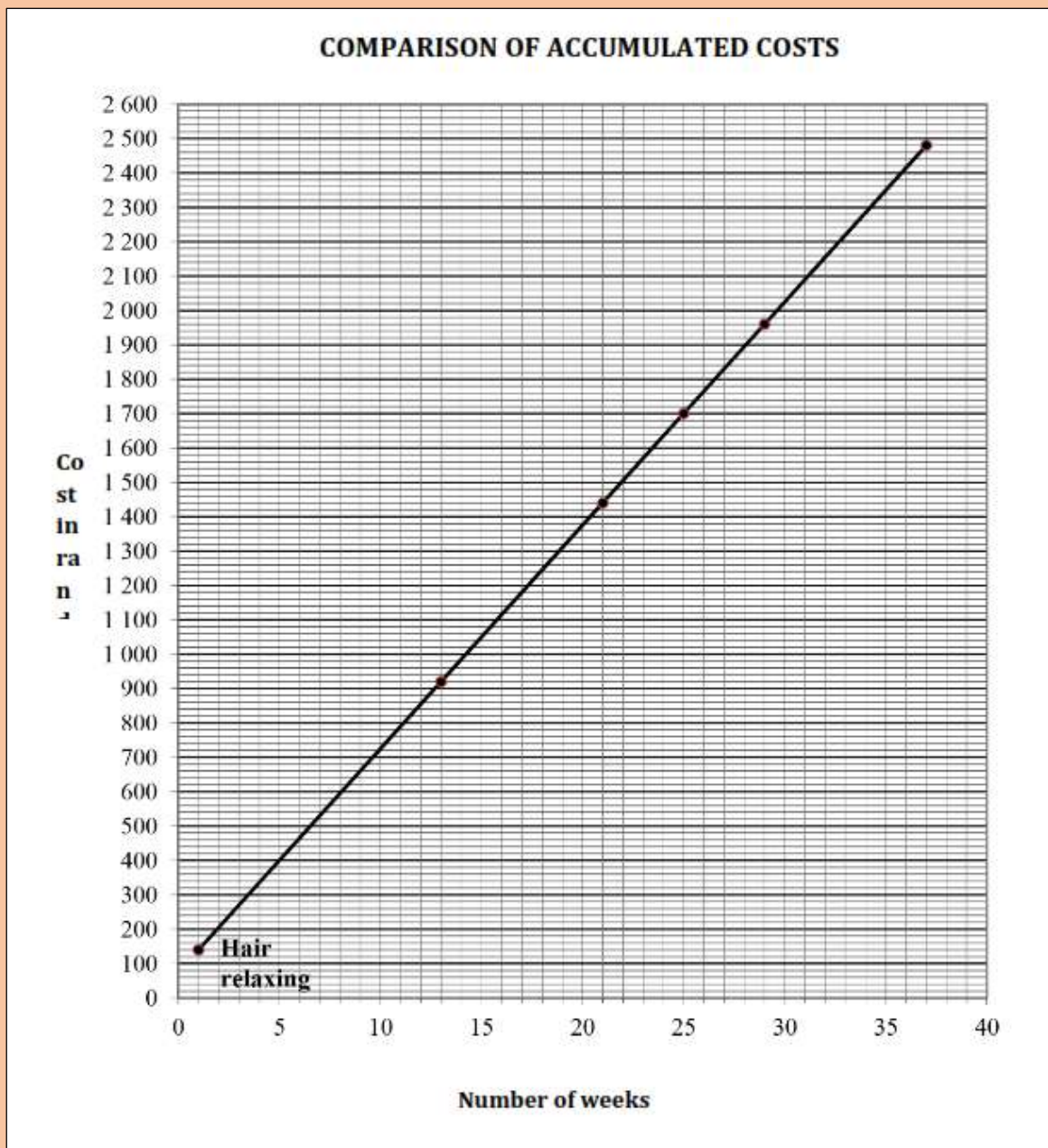
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.4 The graph showing the cost of hair relaxing over a period of 9 months is given on ANNEXURE A. Draw a labelled line graph of the cost of hair extensions over a period of 37 weeks on ANNEXURE A. (6)  
[20]

**ANNEXURE A**

**QUESTION 2.3(d)**



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**The steps for doing these questions are the same as for break-even point questions**

- (1) Summarise the situation
- (2) Formulate the equations
- (3) Complete the table
- (4) Draw graphs using the table
- (5) Analyse the situation by using the graphs

The points of intersection divide the area of the grid into REGIONS – on the grid these are bounded by the points of intersection.

In these REGIONS different advantages and disadvantages for the graphs apply.

To describe the regions you need to revise inequality notation and terminology:

less than (always used for the first region)

more than (always used for the last region)

(always used for the other regions)

Graphs in this section of the work do not always have to be straight lines, it can also be a curve. You need to know how to write down the coordinates of the points of intersection. Eg. (the x-value; the y-value).

So when interpretation is asked, you first give the interval (eg: less than 25 days), and then state the best option (eg Contact A is the cheapest).

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

#### Question 1

AA High School is considering renting a photocopier. They approach two companies (Company A and Company B) and obtain the following quotations:

**Company A:**  
Rental of R800,00 per month, which includes 3 000 free copies per month. Thereafter a charge of 5 cents per copy applies.

**Company B:**  
Rental of R600,00 per month, which includes 2 500 free copies per month. Thereafter a charge of 10 cents per copy applies.

**TABLE 3: Monthly cost (in rand) of renting a photocopier**

Number of copies made	0	2 000	2 500	3 000	4 000	6 000	7 000	8 000
Company A	800	800	800	800	Q	950	1 000	1 050
Company B	600	600	P	650	750	950	1 050	1 150

1.1 Determine the missing values **P** and **Q**. (4)


1.2 Write down a formula that can be used to calculate the total cost per month of renting a photocopier from Company B. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.3 The line graph illustrating the total rental cost for Company B has been drawn on ANNEXURE B. On the same system of axes, draw a line graph to illustrate the total rental cost for Company A. (4)

1.4 Determine the number of photocopies made if the total rental cost for both companies is the same. (2)

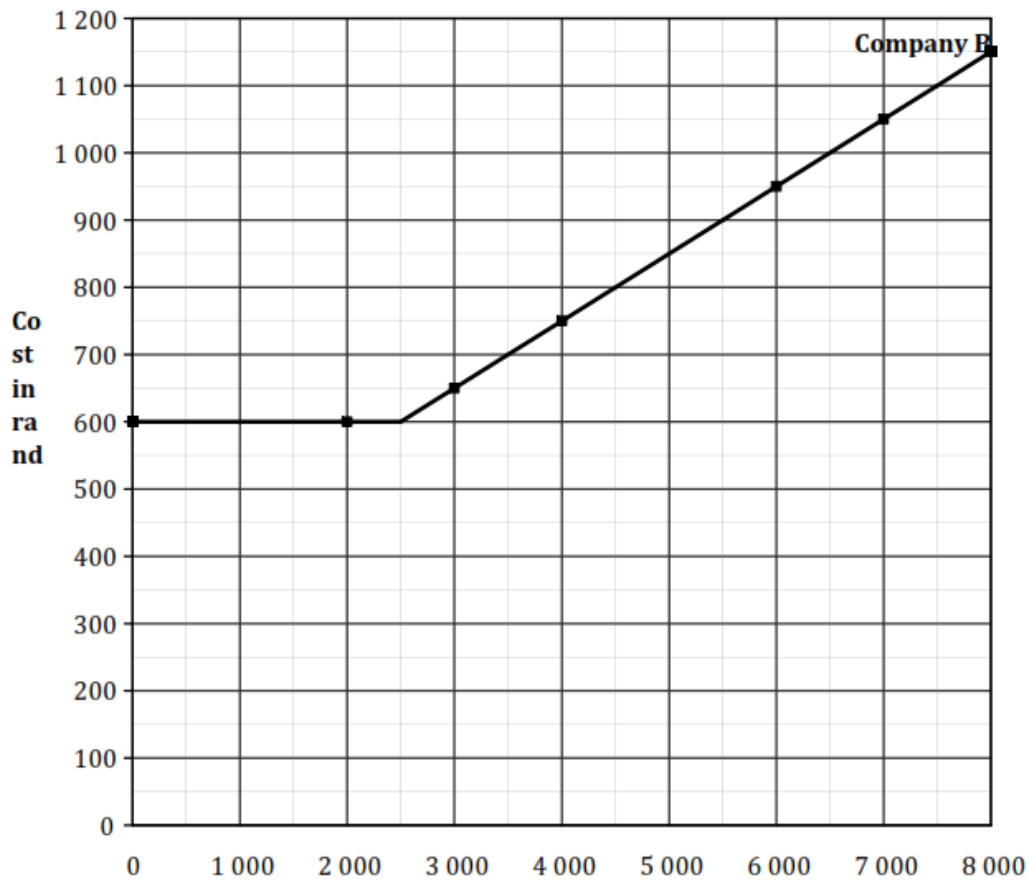

1.5 AA High School makes an average of 7 000 photocopies per month. Calculate how much the school will save by choosing the cheaper rental option and identify the company that charges the lower total rental cost. (3)


[16]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### 1.3 ANNEXTURE B



### QUESTION 2:

Timothy is a newly qualified marketing graduate. He has been offered two positions, one as a medical sales representative for Meds SA and the other as a tobacco sales representative for ABC Cigs.

The formula for calculating the monthly salary for a medical sales representative is:

$$\text{Salary} = \text{R3 000} + \text{R500} \times \text{number of days worked.}$$

As a tobacco sales representative, he will earn a salary of R750 per day for each day worked in a month. He will only receive a salary if he works for one or more days in a month.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.1 Write down a formula that can be used to calculate the monthly salary of a tobacco sales representative. (2)


2.2 Draw TWO line graphs on the same grid on ANNEXURE A to represent the monthly salaries for both the positions of medical and tobacco sales representatives. Clearly label each graph. (8)

2.3 Use the graphs drawn on ANNEXURE A, or otherwise, to answer the following.

(a) After how many working days will the two salaries be the same? (2)

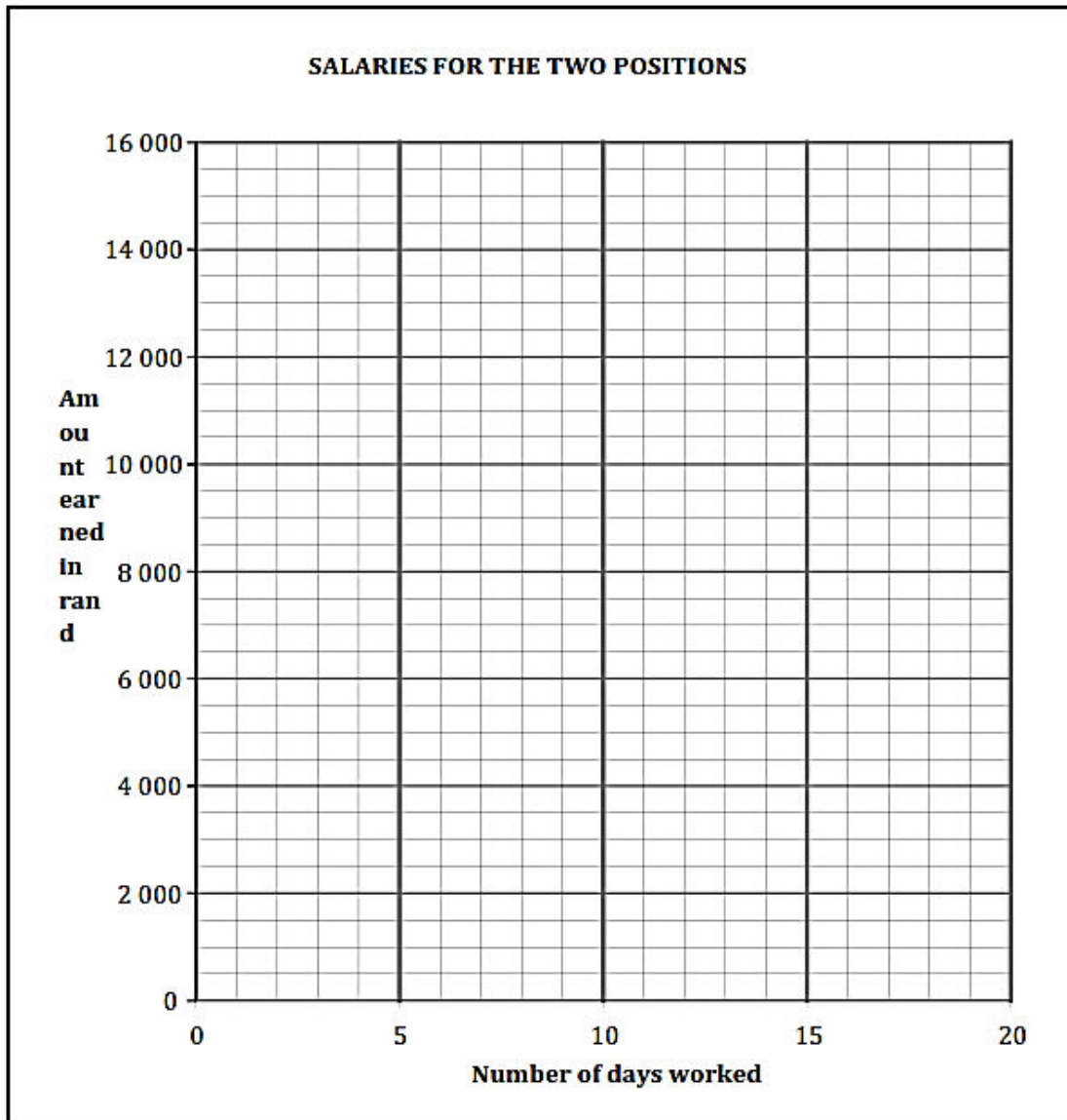

(b) Suppose Timothy worked at Meds SA for 18 days. How many days would he have to work at ABC Cigs to earn the same salary? (2)


[14]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**2.2**  
**ANNEXTURE A**



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Payslips, deductions and tax

- ✓ PAYE on a payslip stands for “pay as you earn”. This is the income tax that is deducted directly from your salary every month.
- ✓ PAYE is compulsory for all employees. It is calculated according to a set percentage based on your gross annual income. Tax is collected by the South African Revenue Service (SARS).
- ✓ UIF stands for “Unemployment Insurance Fund”. It serves as a form of insurance, so that if you lose your job, you may apply for UIF which is a small monthly payout from the government.
- ✓ Employers must pay 2% of each employee’s monthly pay towards UIF. The employees and the employer each contribute 1%.
- ✓ Depending on your employer, you may be a member of a company pension fund or medical aid.

## How is my tax rate calculated, and do I qualify for any rebates?

- ✓ There are set tax thresholds, which are maximum amounts that you can earn before you are required to pay tax.
- ✓ In South Africa, the highest tax rate is 40%, which applies to individuals earning R638 601 and above per annum. The tax tables themselves are a little more complicated than this, but this will suffice for the purpose of understanding your payslip.
- ✓ These are adjusted every year and the new tables are announced with the budget. The tax thresholds for individuals for the 2013/14 financial year are:
  - individuals younger than 65: R67 111
  - individuals aged 65–75: R104 611
  - individuals older than 75: R117 111.
- ✓ Individuals receive standard tax rebates calculated according to age.
- ✓ A tax rebate is an amount of tax by which the total tax due is reduced. In other words, tax rebates reduce the amount of tax you have to pay.
- ✓ The age categories are the same as for tax thresholds, and are known as primary (younger than 65), secondary (65 – 75) and tertiary (older than 75) rebates. They are as follows:
  - Primary: R12 080
  - Secondary: R6 750
  - Tertiary: R2 250

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Example

Company Name					
1 Money Road, Cashville, 1000					
Payslip date : 01/01/2013			Payslip No. : 01		
Empl no. : 01			App. Date : 01/01/2012		
Name : 0000001			I.D. Number : 7001120101015		
Full name : Joe Bloggs					
Paypoint :			Bank Code : 100100		
Cost Centre :			Bank A/c No : 1001001001		
Job Title : Bookkeeper			Job Grade :		
EARNINGS	DAYS/HOURS	AMOUNT	DEDUCTIONS	AMOUNT	BALANCE
Basic Pay	21.67	10000.00	P.A.Y.E	793.33	
			U.I.F.	100.00	
Totals:		21.67	10000.00	893.33	
				Nett Amount:	993.33
Company : Company Name			Empl No. : 01		
Name : Bloggs Joe			I.D. Number : 700110101015		
Date : 01/01/2013			App. Date : 01/01/2012		
Bank Name : Joe's Bank			Bank A/c : 1001001001		
Address : 1 Bloggs Street Cashville 1000					
Accumulated Totals	Ytd Value	Other	Ytd Value		
Gross Remuneration	120000.00	Pay Rate	10000.00		
Tax Deducted	9520.00	TAXABLE EARNINGS	120000.00		

Use the above payslip, and the information on tax to answer the following questions.

- Calculate the daily earnings of Mr. Bloggs.
- (i) How is the amount of UIF calculated?  
(ii) How much does the company pay toward UIF?
- How is the amount of the PAYE calculated?

#### Solutions

- Earnings per day =  $R10\ 000 / 21,67 = R461,47$
- (i) 1% of salary, i.e. 1% of R10 000 = R100  
(ii) R100
- In the example above, Joe Bloggs pays R793,33 PAYE per month. Here's how that figure was calculated:

Joe Bloggs falls into the 18% tax bracket, as he earns less than R165 600 per year.

Gross annual income (R120 000) x tax rate (18%) R21 600

Minus deductions (primary rebate) – R12 080

Subtotal (total tax due per annum) = R9 520

TOTAL (subtotal divided by 12 months) R793,33

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**Exercise**

Payslips, deductions and tax

Study the payslip below and answer the questions.

<b>FASHION DIVA</b>			
<b>NAME:</b> Lucinda Adams		Payslip nr. 009	Pay date: 25 August 2013
<b>ADDRESS:</b> 4 Arcade Ave Kriel		<b>BANK DETAILS:</b> ASBA bank Cheque account 19056634486	
<b>INCOME</b>		<b>DEDUCTIONS</b>	
Basic salary:	R15 780	PAYE/TAX	R2 865,83
Overtime:	____ (a)	Medical Aid:	R1 420
(38 hrs @ R85 p/h		UIF	____ (b)
		(1% of basic salary)	
		Pension fund ( of the amount paid to medical aid fund)	____ (c)
Total income: ____ (d)		Total deductions: ____ (e)	
Net pay (Income – Deductions): ____ (f)			

1. Calculate the missing values in order to complete the payslip. (6)


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2. Lucinda sees that R2 865,83 was deducted from her salary for PAYE (also known as personal tax). Use the table and example below to show that the amount was calculated correctly. (8)


INCOME TAX FOR INDIVIDUALS for the tax year 2011/2012	
TAXABLE YEARLY INCOME (R)	RATE OF TAX (R)
0 – 160 000	18% of each R1
160 001 – 250 000	28 800 + 25% of taxable income above R160 000
250 001 – 364 000	51 300 + 30% of taxable income above R250 000
364 001 – 484 000	81 100 + 35% of taxable income above R346 000
484 001 – 617 000	128 400 + 38% of taxable income above R484 000
617 001 and above	178 940 + 40% of taxable income above R617 000
<b>TAX REBATES:</b>	Primary rebates – R11 440 Secondary Rebates (persons 65–75 years) – R6 390 Tertiary Rebates (persons 75 years and older) – R2 130
<b>TAX THRESHOLD:</b>	Below age 65 years – R63 550 Age above 65 years to below 75 – R99 056 Age above 75 years and older – R110 889
<b>EXAMPLE</b>	R556 444 (yearly salary) R128 400 + 38% of amount above R484 000 (R556 444 – R484 000) = R128 400 + 38% × R72 444 = R155 928,72 – R11 440 = R144 488,72 (yearly tax) ∴ R12 040,73 (monthly tax)

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3. Lucinda wants to buy a coat from Fashion Diva. The coat costs R749 including VAT. As she is an employee of the shop, the owner gives her a discount by not charging her VAT (14%) on the coat. Calculate the amount she would have to pay.(2)


[16]

### Question 2

Rodney's wife is 66 years old. Her taxable income for 2012 was R315 054. The amount of tax payable is calculated using the following table:

TABLE 3: Tax calculation table TAXABLE INCOME (in rand)	RATES OF TAX (in rand)
0 to 160 000	18%
160 001 to 250 000	28 800 + 25% of the amount above 160 000
250 001 to 346 000	51 300 + 30% of the amount above 250 000
346 001 to 484 000	80 100 + 35% of the amount above 346 000
484 001 to 617 000	128 400 + 38% of the amount above 484 000
617 001 and above	178 940 + 40% of the amount above 617 000

[Source: [www.sars.gov.za](http://www.sars.gov.za) on 17 November 2012]

Taxpayers qualify for:

- A primary rebate\* of R11 440
- An additional rebate\* of R6 390 if they are 65 years or older

3.1 Calculate her monthly rebate (3)


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3.2 Determine the monthly tax payable by Rodney's wife (7)


**Question**

A construction company who built a number of RDP houses employed workers for 8 hours per day working a 5-day week. They were paid a normal rate of R40 per hour.

Determine the normal weekly wage per employee.

Use the formula: **Weekly wage (in rand) = number of days worked × number of hours per day × rate per hour**

4.1.1 The owner paid the employees an overtime rate of R50 per hour. (2)


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4.1.2 Write the ratio of the overtime rate to the normal rate in simplified form.(2)


4.2 If one of the employees received R350 for overtime worked in a given week, determine the number of hours he worked overtime. (3)


4.3 Ferdi planned to take 2 hours unpaid leave, but still wanted to earn a weekly wage of R1 920. If he worked 38 normal working hours, calculate how many hours he had to work overtime to earn this wage. Use the formula: **Number of overtime hours**

$$= \frac{\text{weekly wage} - (\text{number of normal working hours} \times 40)}{50} \quad (3)$$


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### Summary

- ✓ **Rebate** : Is an amount deducted after annual tax has been deducted
- ✓ The older the citizen, the higher the rebate
- ✓ People younger than 60 get the primary rebate ( compulsory rebate to every citizen)
- ✓ People above 65 qualify for both primary and secondary rebate
- ✓ People above 75 qualify for tertiary rebate(the highest rebate)
- ✓ **Tax threshold** is the minimum salary a person earns before tax is charged
- ✓ **The people earning lower than the tax threshold do not pay tax**
- ✓ Tax brackets are rates used to calculate individual tax able income,it differs annually
- ✓ When working with tax brackets calculate the annual income,then identify the tax brackets ,use the rates provided to calculate the annual tax.

### Exercise ( finance)

Longhorn Heights High School needs R7 000,00 to buy a new computer. The finance committee decides to sell raffle tickets to raise funds. A food hamper donated by one of the school's suppliers will be the prize in the raffle.  
*A raffle is a way of raising funds by selling numbered tickets. A ticket is randomly drawn and the lucky ticket holder wins a prize.*

The committee decides to sell the raffle tickets at R2,00 each. The tickets will be divided evenly amongst a number of ticket sellers.

1.1. Write down a formula that can be used to calculate the number of tickets to be given to each ticket seller in the form:

**Number of R2,00 tickets per seller = ...** (2)


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TABLE 2 below shows the relationship between the number of ticket sellers and the number of tickets to be sold by each seller.

**TABLE 2: Sale of R2,00 raffle tickets**

Number of ticket sellers	<b>P</b>	20	25	35	50	100	125	140
Number of tickets per seller	250	175	140	100	70	35	<b>Q</b>	25

1.2.1 Identify the type of proportion represented in TABLE 2 above. (2)

1.2.2 Calculate the missing values **P** and **Q**. (4)

1.2.3 Use the information in TABLE 2 or the formula obtained in QUESTION 1.1 to draw a curve on ANNEXURE A to represent the number of ticket sellers and the number of tickets sold by each seller. (4)

The finance committee changed their plan and decided to sell the tickets at R5,00 each instead.

1.3.1 Give a possible reason why they made this decision. (3)

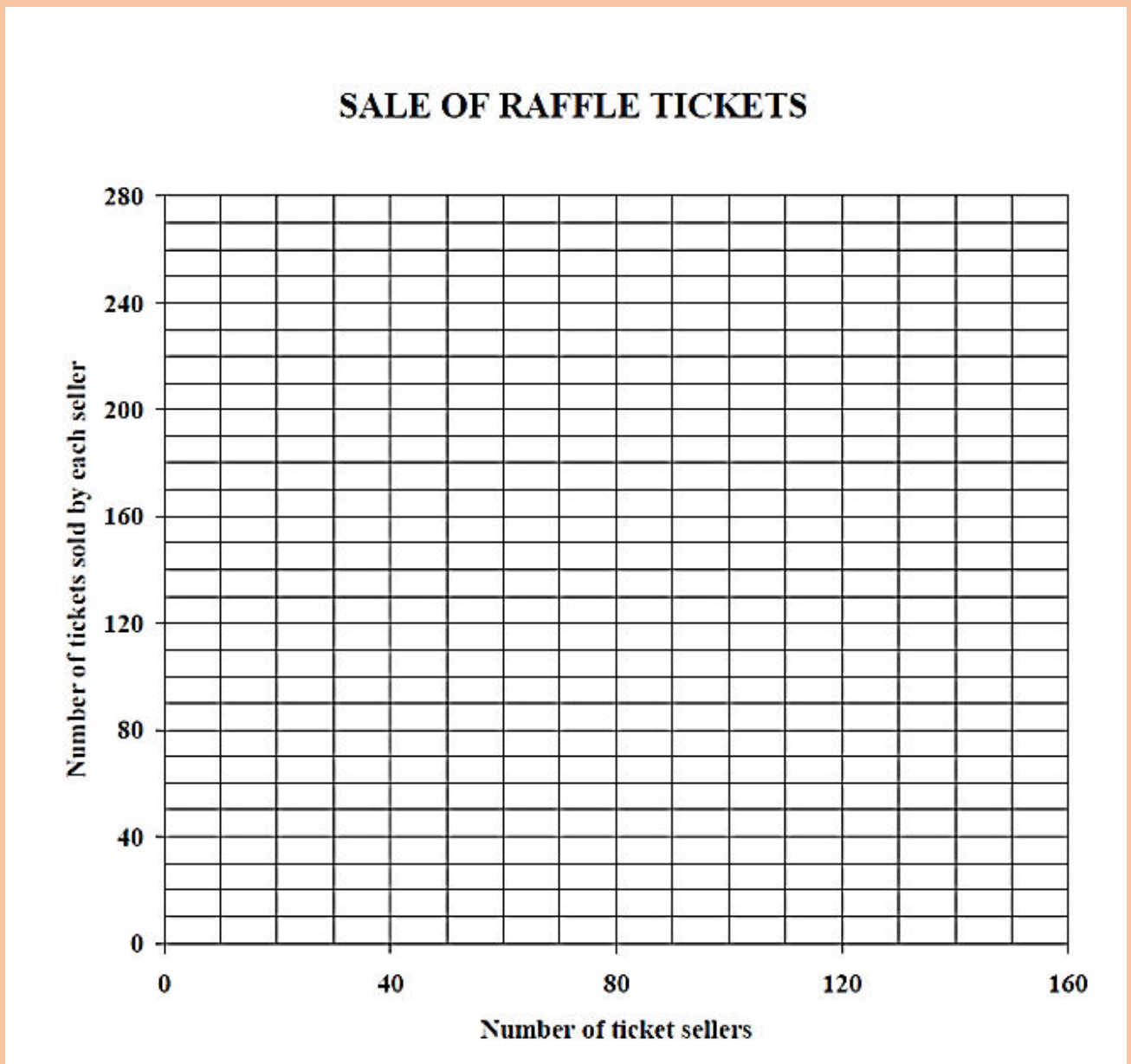
1.3.2 State ONE possible disadvantage of increasing the price of the tickets. (2)

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1.3.3 Draw another curve representing the number of ticket sellers and the number of R5,00 tickets sold by each seller on the graph paper below. Show ALL the necessary calculations. (4)


1.3.4 Use your graph, or otherwise, to calculate the difference between the number of R2,00 and R5,00 tickets that must be sold by 70 ticket sellers (8)



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## Measurement

Converting between different units of measurement

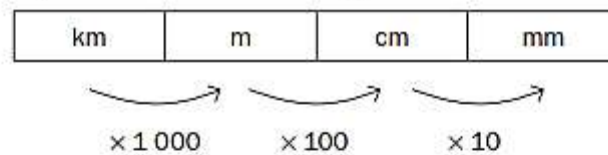
### Metric conversions

You need to memorise the conversions between metric units.

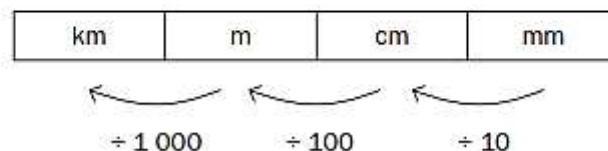
L

Conversion factors for length
10 millimetres (mm) = 1 centimetre (cm)
1 000 millimetres (mm) = 1 metre (m)
100 centimetres (cm) = 1 metre (m)
1 000 metres (m) = 1 kilometre (km)

Here is a visual representation of converting between units of length:



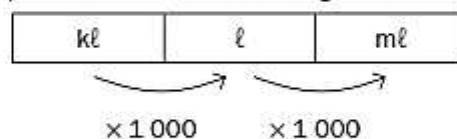
We can also reverse it to find lengths in larger units:



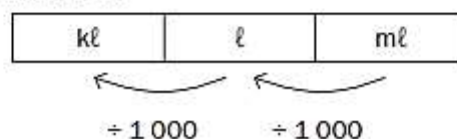
### Volume

Conversion factors for volume
1 000 millilitres (mℓ) = 1 litre (ℓ)
1 000 litres (ℓ) = 1 kilolitre (kℓ)

Here is a visual representation of converting between units of volume:



And you can also reverse it:



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## Weight

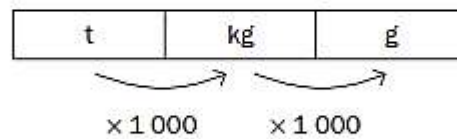
Conversion factors for weight

1 000 mg (mg) = 1 gram (g)

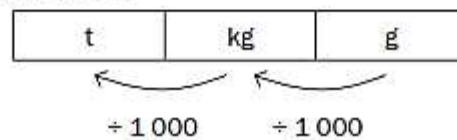
1 000 grams (g) = 1 kilogram (kg)

1 000 kilograms (kg) = 1 tonne (t)

Here is a visual representation of converting between units of weight:



And one can also reverse it:



### Example

Convert the following units. Remember to show all of your calculations.

- A leaf is 25 mm long. How long is it in cm?
- A sofa is 187 cm long. How long is it in metres?
- Harry's household uses 1 023 l of water per month. How much water do they use in kl?
- A tin contains 3,5 l of paint. How many millilitres of paint is in the tin?
- The cover of a book is 16,2 cm long. How long is the book in mm?
- A medicine tablet weighs 50 mg. How much does the tablet weigh in grams?
- A shopping bag weighs 2 850 g. How heavy is the bag in kg

- Converting to a larger unit, divide by 10:  $25 \text{ mm} = 2,5 \text{ cm}$ .
- Converting to a larger unit, divide by 100:  $187 \text{ cm} = 1,87 \text{ m}$ .
- Converting to a larger unit, divide by 1 000:  $1\,023 \text{ l} \div 1\,000 = 1,023 \text{ kl}$ .
- Converting to a smaller unit, multiply by 1 000:  $3,5 \times 1\,000 = 3\,500 \text{ ml}$ .
- Converting to a smaller unit, multiply by 10:  $16,2 \text{ cm} \times 10 = 162 \text{ mm}$ .
- Converting to a larger unit, divide by 1 000:  $50 \text{ mg} \div 1\,000 = 0,05 \text{ g}$ .
- Converting to a larger unit, divide by 1 000:  $2\,850 \div 1\,000 = 2,85 \text{ kg}$ .

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Do the conversions.

1. A tennis court is 23,78 m long. Convert to cm. (1)


2. Thabiso fills a bath with 23,7l of water. How much water is this in ml? (1)


3. The distance between Cape Town and Betty's Bay is 90,25 km. How far is this in metres? (1)


4. The distance from Phumza's house to the shop is 1 890 000 mm. How far is this in kilometres? (1)


5. A can of cola has a capacity of 330 ml. How many litres of cola is this? (1)


6. A boulder weighs 2,35 t. Convert the weight of the boulder into grams. (1)

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7. A book weighs 0,85 kg. Convert the weight of the book into grams. (1)


8. Jack and Thembile live 6 473 m apart. Convert this distance to km. (1)


9. The dam on Cara's farm contains 6,025 kl of water. How much is this in litres? (1)


10. A playground is 4,02 m wide. How wide is the playground in cm? (1)


11. A car weighs 1 250 000 g. What is the mass in tonnes? (1)


12. A long workbench is 295 cm long. How long is it in metres? (1)


[12]

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## Cooking conversions and temperature

Conversions for cooking and baking
1 cup = 250 ml
1 tablespoon (tbsp) = 15 ml
1 teaspoon (tsp) = 5 ml

## Measuring length

### Example

Carl needs to measure the width of a window, to find out how much material he must buy to make a curtain. The curtain material costs R55 per metre on sale, sold only in full metres.

a) Carl estimates the width of the window to be 1,9 metres wide (using his arm). If Carl goes to the shop with this estimate:

- (i) How many metres of material should he buy?
- (ii) How much would the material cost?

b) Carl decides to double-check his estimated measurement before he buys the material and so he uses his tape measure to accurately measure the width of the window. He determines that the window is actually 2,2 m wide.

- (i) How many metres of material does he need to buy?
- (ii) How much will the material cost?

### Solution

a) (i) 2 m

(ii)  $2 \times R55 = R110$

b) (i) 3 m (as the material is only available in units of 1 metre)

(ii) 3

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### Example

Liz sews dresses for children. The material costs R89,50 per metre and she needs 2 metres of material to make a dress for a 4 year old; 2,5 metres to make a dress for a 7 year old and 3 metres to make a dress for 10 year old. The embroidery cotton costs R12,55 for a roll of 3 metres. She uses 2 rolls of cotton per dress.

- a) How many metres of material will she need to make the following four dresses: 1 dress for a 7 year old, 2 dresses for four year olds, and 1 dress for a 10 year old?
- b) What will the material cost for the four dresses?
- c) What is the length of embroidery cotton that Liz is going to use when sewing one dress, in metres and centimetres?
- d) What is the total amount that she will pay for the embroidery cotton?
- e) What is the total cost of a dress for a 10 year old?

### Solutions

a)  $2,5 \text{ m} + 2 \text{ m} + 2 \text{ m} + 3 \text{ m} = 9,5 \text{ m}$

b) Length of material  $\times$  price =  $9,5 \text{ m} \times \text{R}89,50$   
= R850,25

c) Length of one roll of cotton  $\times$  2 =  $3 \text{ m} \times 2 = 6 \text{ m}$ , or 600 cm per dress

d) Number of dresses  $\times$  2 rolls of cotton per dress  $\times$  price =  $4 \times 2 \times \text{R}12,55 = \text{R}100,40$

e) (Length of material  $\times$  price) + (2 rolls of cotton  $\times$  price) =  $(3 \text{ m} \times \text{R}89,50) + (2 \times \text{R}12,55)$   
= R268,50 + R25,10  
= R293,60

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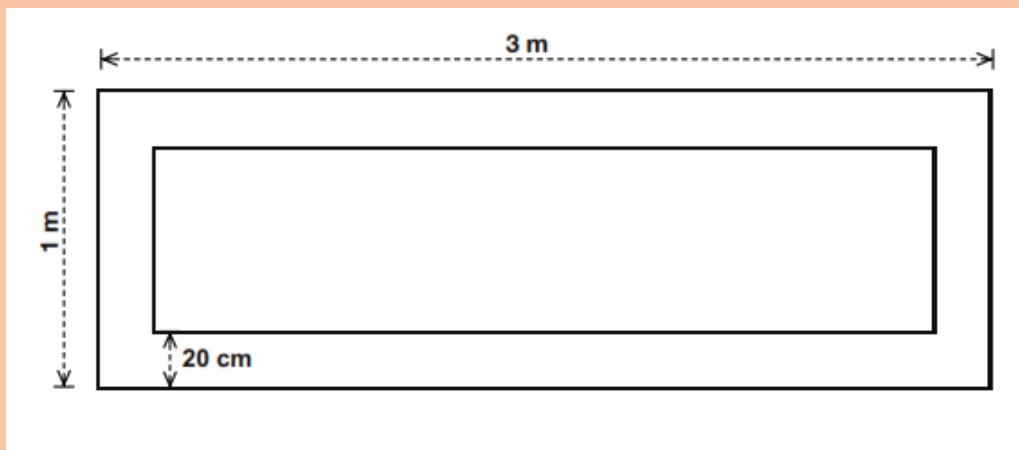
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### Exercise

Jenny has started a decorating business and has a contract to provide decor at a wedding reception.

1. The tables used at this wedding are rectangular with a length of 3 m and a width of 1 m as shown below. The fabric she plans to use for the tablecloth costs R75 per metre (but can be bought in lengths smaller than a metre) and is sold in rolls that are 1,4 m wide. The bride and groom want the tablecloths to hang at least 20 cm over the edges of the tables. Calculate the cost of the cloth for each table. (2)


2. If there are 15 tables at the wedding, calculate how much she is going to spend on tablecloths alone. (1)

[3]

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### Measuring mass or weight

#### Example

a) A lift in a shopping mall has a notice that indicates that it can carry 2,2 tonnes or a maximum of 20 people. Convert the tonnes measurement to kilograms and work out what the engineer who built the lift estimated the average weight of a person to be.

b) A long distance bus seats 50 passengers and allows each passenger to each have luggage of up to 30 kg.

(i) If 50 people, with average weight of 80 kg per person, each have one piece of luggage that weighs an average of 29 kg, what would be the total load carried by the bus, in tonnes?

(ii) If the bus weighs 4 tonnes, how much does it weigh in total (in kg) including all the passengers and the luggage?

c) Sweet Jam can be bought in bulk from a warehouse in boxes that contain 25 tins of 250 g each.

(i) Calculate the total weight of the jam in each box, in kg.

(ii) If a trader orders 15 boxes of Sweet Jam, calculate the total weight of his order in kg.

#### Solutions

a)  $2,2 \text{ t} = 2\,200 \text{ kg}$ .  $2\,200 \text{ kg} \div 20 \text{ people} = 110 \text{ kg each}$

b) (i)  $(50 \times 80 \text{ kg}) + (50 \times 29 \text{ kg})$

$$= 4\,000 \text{ kg} + 1\,450 \text{ kg}$$

$$= 5\,450 \text{ kg}$$

$$= 5,45 \text{ t}$$

(ii)  $4 \text{ t} = 4\,000 \text{ kg}$ .  $4\,000 \text{ kg} + 5\,450 \text{ kg} = 9\,450 \text{ kg}$

c) (i)  $250 \text{ g} \times 25$

$$= 6\,250 \text{ g}$$

$$= 6,25 \text{ kg}$$

(ii)  $15 \text{ boxes} \times 6,25 \text{ kg} = 93,75 \text{ kg}$

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### Exercise

You should never carry more than 15% of your body weight. Elias weighs 66 kg and his backpack, with school books, weighs 12 kg. Elizabeth weighs 72 kg and her school bag, with school books, weighs 8 kg.

1. Determine 15% of Elias's weight. Is his bag too heavy for him? (1)


2. Determine 15% of Elizabeth's weight. Is her bag too heavy for her? (1)


### Example

Mr Booyens needs to buy sand to build a new room onto his house. Sand is sold for R23 per kg. Mr Booyens needs to buy 0,8 tonnes of sand in order to build the room.

- Write the amount of sand needed in kg.
- Calculate the total amount of money he will have to spend to buy enough sand for the project.
- If sand is only sold in 50 kg bags, how many bags will Mr Booyens need to buy?

### Solution

- Remember that 1 tonne = 1 000 kg so he needs  $0,8 \text{ tonnes} \times 1\,000 \text{ kg} = 800 \text{ kg}$
- Quantity of sand needed  $\times$  Cost per kg =  $800 \times 23 = \text{R}18\,400$
- He will need:  $800 \text{ kg} \div 50 \text{ kg} = 16 \text{ bags of sand}$

[2]

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Exercise

### Cost and weight

A chef is preparing a meal that needs 3,75 kg of rice and 1,5 kg of beef. The recipe will feed 8 people.

1. Rice is sold in packets of 2 kg. How many packets will he need for the meal? (1)


2. If rice costs R 31,50 per 2 kg pack, calculate the total cost of the rice he will need. (1)


3. If beef costs R 41,75 per kg, calculate the total cost of the beef needed for the meal. (1)


4. Calculate the total cost of the rice and the beef. (1)


[4]

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### Measuring volume and capacity

Volume is a measurement of how much space an object takes up. Capacity is a measure of how much liquid a container can hold when it is full. For example, if you have a 500 ml bottle of cola, with 200 ml of cola left inside it, the capacity of the bottle is 500 ml, while the volume of cola inside it is 200 ml.

#### Example

An urn of boiling water in an office has a capacity of 20 litres.

- a) If it is filled to maximum capacity, calculate the number of 250 ml cups that can be shared from it.
- b) After everyone has had their morning tea, there are only 6 litres of water left in the urn.
  - (i) How much water is this in ml?
  - (ii) How many 250 ml cups of water are left in the urn now?
  - (iii) What percentage is the remaining 6 litres of the urn's capacity?

#### Solutions

a) 20 litres = 20 000 ml

Then  $20\,000\text{ ml} \div 250\text{ ml} = 80$

80 cups can be poured from the urn.

b) (i) 6 l = 6 000 ml

(ii)  $6\,000\text{ ml} \div 250\text{ ml} = 24$

There are 24 cups of water left in the urn.

(iii)  $6\text{ l} \div 20\text{ l} \times 100 = 30\%$

The urn is 30% full.

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### Example 2

Jabu is building a new flower bed and is using a bucket to carry soil from another part of the garden to the new bed. He knows his bucket has a capacity of 10 l.

a) If 300 l of soil must be moved, and for each trip Jabu fills the bucket to the top with soil, how many trips will Jabu have to make with the bucket to move all the soil?

b) Jabu decides that 10 litres of soil is too heavy to carry. How many trips will he have to make to move all the soil if he only fills the bucket with 7 litres of soil at a time?

c) Jabu's friend Matthew arrives with his wheelbarrow and a spade. He suggests that Jabu should rather move the soil using the wheelbarrow. If the wheelbarrow has a capacity of 150 litres and they fill it to capacity, how many trips will Jabu have to make to move all the soil?

### Solution

a)  $300 \text{ l} \div 10 \text{ l} = 30$  trips

b)  $300 \text{ l} \div 7 \text{ l} = 42,8$

Jabu can't make 0,8 of a trip so we round this up to 43 trips (even though the bucket won't have 7 litres of soil in it for the last trip).

c)  $300 \text{ l} \div 150 \text{ l} = 2$  trips

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### Exercise

#### Measuring volume

Jonathan uses the following recipe to make chocolate muffins:

- $\frac{2}{3}$  cup of baking cocoa
- 2 large eggs
- 2 cups of flour
- $\frac{1}{2}$  cup of sugar
- 2 teaspoons of baking soda
- $1\frac{1}{3}$  cups of milk
- $\frac{1}{3}$  cup of sunflower oil
- 1 teaspoon of vanilla essence
- $\frac{1}{2}$  teaspoon of salt

1. If 1 teaspoon = 5 ml, calculate how much baking soda Jonathan will use. Give your answer in ml. (1)


2. Calculate the amount of vanilla essence Jonathan will use in this recipe. Give your answer in ml. (1)


3. Jonathan does not own measuring cups but he does own a measuring jug calibrated in ml. How many ml of flour does he need? (1 cup = 250 ml) (1)


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5. If Jonathan buys a 100 ml bottle of vanilla essence, how many times will he be able to use the same bottle, if he bakes the same amount of muffins each time? (1)


6. The recipe above is used to make 30 muffins. Calculate how many cups of flour Jonathan will need to make 45 muffins. (1)


[5]

### Example

Suppose paraffin is sold at R7,80 per litre at the service station.

- a) How much will you pay for 5 litres of paraffin?
- b) How many litres of paraffin will you be able to buy for R20? Round off your answer to two decimal places.
- c) If you have a paraffin lamp at home that can hold 500 ml of paraffin, how many times will you be able to refill the lamp if you buy 3 litres of paraffin?

### Solutions

a) Number of litres  $\times$  Cost per litre = 5 litres  $\times$  R7,80 = R39

b) Amount of money  $\div$  Cost per litre

= R20  $\div$  R7,80

= 2,564 102 56...

~ 2,56 litres (to two decimal places)

c) 3 litres = 3 000 ml 3 000 ml  $\div$  500 ml = 6. You would be able to refill the lamp 6 times.

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Example

Petrol costs R11,72 a litre.

a) Calculate how much it costs to fill up a car that has a tank with a capacity of 50 litres.

b) Calculate how many litres you could buy with R200. Round off your answer to two decimal places.

### Solutions

a) Number of litres  $\times$  Cost per litre = 50 litres  $\times$  R10,72 = R536

b) Amount of money  $\div$  Cost per litre

= R200  $\div$  R10,72

= 18,656 716 4...

$\sim$  18,66 litres (to two decimal places)

### Exercise Cost and volume

1. Thandi is baking cupcakes and her recipe requires  $1\frac{1}{3}$  cup of milk.

1.1 Calculate how many ml of milk she will need if 1 cup = 250 ml. (1)


1.2 If the recipe is for 20 cupcakes, calculate the amount of milk required to bake 30 cupcakes. Give your answer in litres. (2)


1.3 Milk is sold in bottles of 1 litre for R8,50 at the local store. Calculate the amount of money Thandi will need to spend on milk to make the 30 cupcakes. (1)

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2. Thabiso decides to sell homemade lemonade. He has made 5 litres of lemonade to sell at the local schools' rugby tournament.

2.1 Thabiso will be selling his lemonade in 250 ml plastic cups. Calculate the number of cups of lemonade he will be able

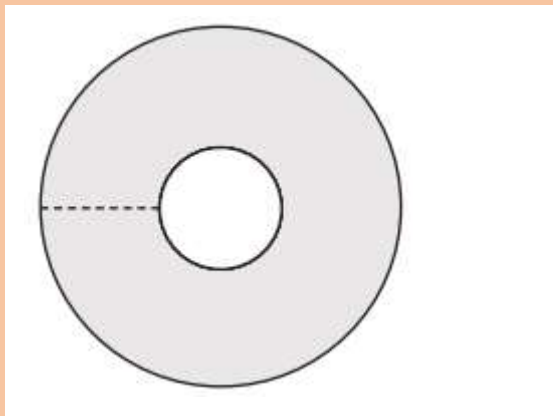
to sell. (1)


2.2 If he sells the lemonade at R5 per cup, how much money will he make from the lemonade? (Assume that he sold all of his lemonade). (1)


2.3 If it cost Thabiso R120 to make the lemonade, how many cups would he need to sell (at R5 each) before he's made back the money he spent? (1)


[3]

3. Mrs Dlamini buys a new lampshade for a lamp. She measures the radius of the inside circle in the lampshade to be 50 mm. The diameter of the outside (larger) circle is 40 cm. (Note, the diagram is not drawn to scale.)



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3. Calculate the circumference of the smaller, inner circle (in cm). (3)


3.2. Calculate the circumference of the larger, outer circle (in cm). Round off your answer to one decimal place. (3)

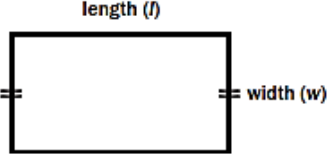
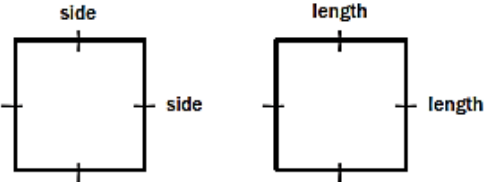
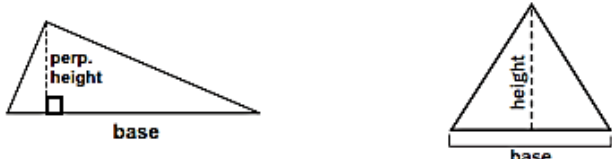
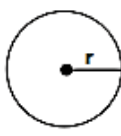

3.3 Calculate the perimeter of half of the larger, outer circle (in cm). (1)


3.4. Calculate the width of the area shown by the dotted line in the diagram above. (1)


[8]

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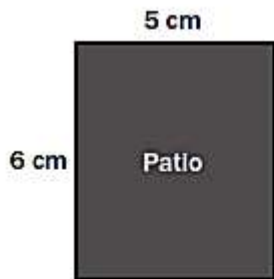
Area formula	Diagram
<b>Rectangle</b> length $\times$ width	
<b>Square</b> length $\times$ length = length <sup>2</sup> or side $\times$ side = side <sup>2</sup>	
<b>Triangle</b> $\frac{1}{2} \times$ base $\times$ perpendicular height	
<b>Circle</b> $\pi \times$ radius <sup>2</sup>	

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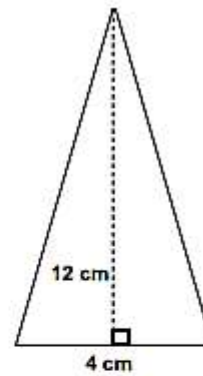
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Using the appropriate formula from the given table, calculate the areas of the following three shapes (in  $\text{cm}^2$ ). Diagrams are not drawn to scale.

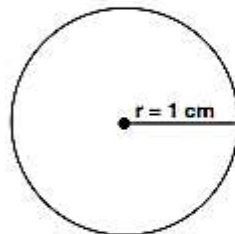
a)



b)



c)



### Solutions

a) Area of rectangle = length  $\times$  width  
 $= 5 \text{ cm} \times 6 \text{ cm}$   
 $= 30 \text{ cm}^2$

b) Area of triangle =  $\frac{1}{2} \times$  base  $\times$  perpendicular height  
 $= \frac{1}{2} \times 4 \text{ cm} \times 12 \text{ cm}$   
 $= 24 \text{ cm}^2$

c) Area of circle =  $\pi \times$  radius<sup>2</sup>  
 $= 3,142 \times (1 \text{ cm})^2$   
 $= 3,142 \times 1 \text{ cm}^2$   
 $= 3,142 \text{ cm}^2$

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Your Mathematical Literacy classroom gets new tables, shaped as shown alongside.

- a) Using the appropriate formulae, calculate the area of the table, in  $\text{m}^2$ .  
b) If each table cost R615 and ten tables were bought, calculate how much the tables cost per  $\text{m}^2$ .  
(Hint: calculate the total cost of the tables and their total area first.)

### Solution

- a) We can see that the table is made up of two identical triangles, and one rectangle.

The formula for the area of a triangle is:

$$\frac{1}{2} \times \text{base} \times \text{height}.$$

So the area of one of our triangles is:

$$\begin{aligned} & \frac{1}{2} \times 500 \text{ mm} \times 70 \text{ cm} \\ &= \frac{1}{2} \times 0,5 \text{ m} \times 0,7 \text{ m (change the units to metres)} \\ &= 0,175 \text{ m}^2 \end{aligned}$$

The formula for the area of a rectangle is: length  $\times$  breadth.

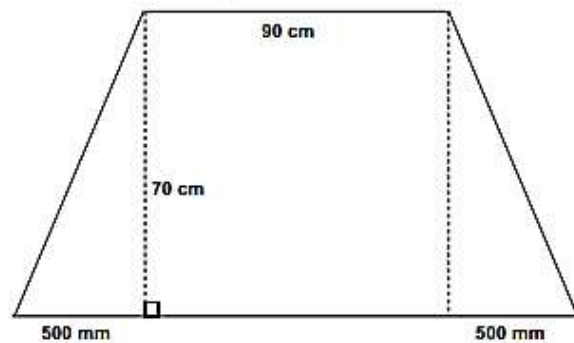
So the area of the middle rectangle is:

$$\begin{aligned} & 0,9 \text{ m} \times 70 \text{ cm} \\ &= 0,9 \text{ m} \times 0,7 \text{ m (change the units to metres)} \\ &= 0,63 \text{ m}^2 \end{aligned}$$

Now we simply add the three areas together:

$$\begin{aligned} & \text{Area triangle} + \text{area rectangle} + \text{area triangle} \\ &= 0,175 \text{ m}^2 + 0,63 \text{ m}^2 + 0,175 \text{ m}^2 \\ &= 0,98 \text{ m}^2 \end{aligned}$$

- b) 10 tables will cost  $\text{R}615 \times 10 = \text{R}6\,150$ .  
10 tables will have a total area of  $0,98 \text{ m}^2 \times 10 = 9,80 \text{ m}^2$ .  
 $\text{R}6\,150 \div 9,80 \text{ m}^2 = \text{R}627,55$   
So the tables cost R627,55 per square metre.



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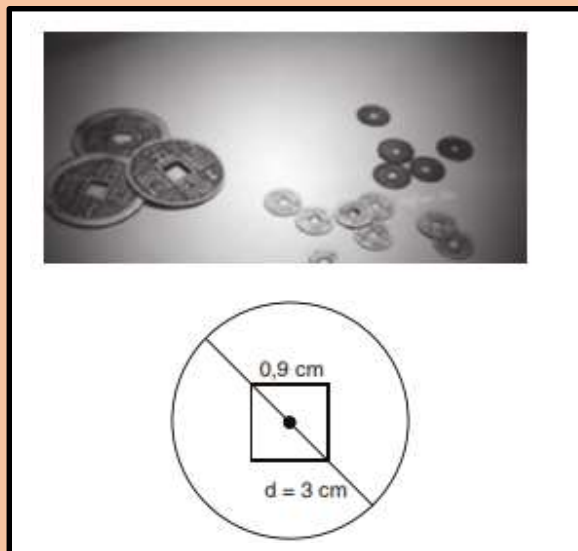
### Activity

For your birthday, a friend gives you a rare, lucky coin that has a square cut out of the middle as shown in the photo and diagram.

1. You measure the diameter of the circle to be 3 cm, and the length of one side of the square to be 0,9 cm. Calculate the area of the coin in cm. Round off your answer to one decimal place. (7)


2. If the coin is worth R3,58 per cm<sup>2</sup>, calculate its value. (2)

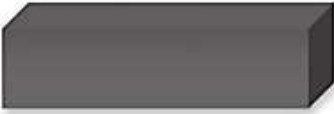


[9]



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### Using formulae to calculate volume

Shape	Volume formula	
Rectangular box	$V = l \times b \times h$	
Cylinder	$V = \pi \times r^2 \times h$	

#### Example

Cedric is building a house. First he digs the rectangular foundation for the house. The foundation is filled with cement. The dimensions of the foundation are

8 m  $\times$  0,5 m  $\times$  0,5 m.

- Calculate the volume of the foundation.
- If concrete for the foundation costs R180,00/m, what is the total cost of the concrete for the foundation?
- Cedric finds cheaper concrete at a total cost of R320 for 2 m<sup>2</sup>. Calculate the cost per m<sup>3</sup>.

#### Solutions

a) Volume = 8  $\times$  0,5  $\times$  0,5 = 2 m<sup>3</sup>

b) Total cost of concrete = 2  $\times$  R180,00  
= R360,00

c) Cost per m  
= R320,00  $\div$  2  
= R160,00

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### Activity

Allison needs to bake cookies for her son's crèche. She finds a recipe for cookies. She needs to calculate the volume of 1 cookie so that she knows what size container she can use. Each cookie is shaped like a flat cylinder. She measures a cookie and finds that it has these dimensions: diameter = 80 mm; height = 7 mm.

1. Calculate the volume of 1 biscuit, to one whole number. (3)


2. Calculate the volume of 50 biscuits. (1)


3. Would a container with a volume of 700 cm hold the biscuits? Explain. (2)


4 . A school builds a swimming pool with the following dimensions: length = 15 m; depth = 1,3 m to the filling level, and width = 5 m. (1 m = 1 000 l and 1 000 l = 1 kl)

4.1. Calculate the volume of the swimming pool up to the level it is filled. (1)


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4.2. Convert this volume (i) to litres


(ii) and kilolitres. (2)


5 . When the school fills the pool, they use a pump which pumps water at a rate of 2 l per second. How long would it take to fill up the pool? Give your answer in hours and minutes. (1)


6. Water costs R8,64 per kilolitre. How much will it cost the school to fill up the pool? (1)


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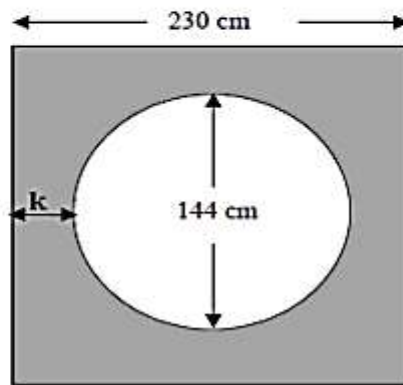
**Navin's company has hired Mr Buthelezi to renovate their reception room.**

Mr Buthelezi installed a circular window in the centre of a square wall, as shown in the diagram below. He intends painting the wall.

The diameter of the circular window is 144 cm.

The length of each side of the square wall is 230 cm.

The shortest distance between the edge of the window and the edge of the wall is shown as  $k$  in the sketch.



7.1 Determine the length of the radius of the window (2)


7.2 Determine the value of  $k$  in centimetres. (3)

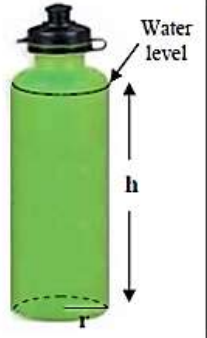

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7.3 Calculate the circumference of the window. (3)


7.4 Calculate the area of the wall that he needs to paint (4)


Mr Buthelezi has affiliated with Ultra cyclist marathon association and he will be taking part in the Bessies Greek race. In preparation for the race he practices daily.

<p>A cyclist is advised to drink at least 0,5 <math>\ell</math> of water for every hour cycled.</p> <p>The water bottle that he uses is mostly cylindrical.</p> <p>The radius (<math>r</math>) of the cylindrical part of the water bottle is 3,25 cm and it is filled with water to a height (<math>h</math>) of 15,1 cm, as shown in the sketch alongside.</p>	
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7.5 Determine the minimum volume of water the cyclist must drink if he/she cycles for 7 hours. (2)


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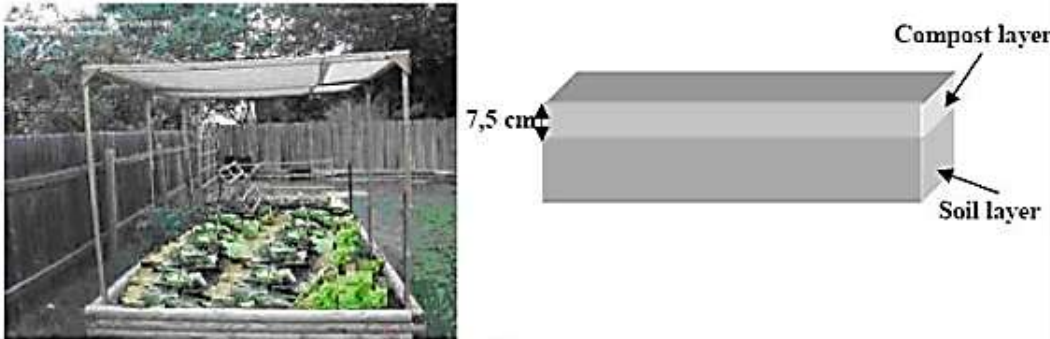
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7.6 Determine the surface area of the cylindrical section of the water bottle. (2)


7.7 A cyclist decides to use a bigger bottle with a volume of 750 ml. How many 750 ml bottles of water will be needed if he/she uses a total of 4 200 ml of water? (3)


8 Wandile is the cook at a boarding school. He is responsible for buying fresh vegetables for cooking.

Wandile decides to grow his own vegetables. He makes a rectangular vegetable garden with length = 2,5 m and breadth = 1,5 m.



Shade-netting over the vegetable garden

Wandile wants to cover only the vegetable garden with shadenetting.

8.1 Calculate the area that the shade-netting will cover. (2)


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8.2 Wandile adds a 7,5 cm layer of compost to his vegetable garden. Calculate the volume of the compost added. (3)


9.

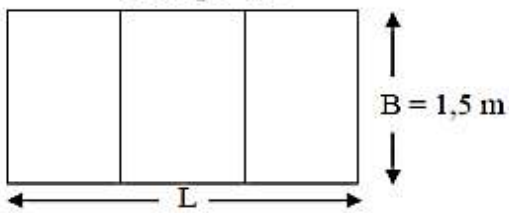
To reduce her electricity bill, Mrs Ntanzi decides to install a solar geyser on the roof of her house.

The solar geyser consists of rectangular solar panels and a cylindrical storage tank as shown in the diagrams.

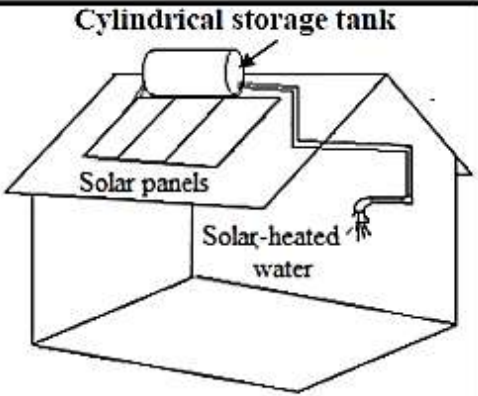
The solar panels use sunlight to heat the water stored in the cylindrical tank. The heated water can then be used in the house.

There are altogether six people in Mrs Ntanzi's household.

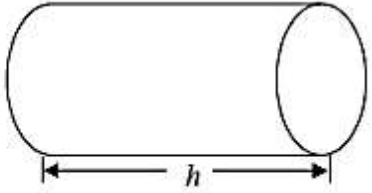
**Solar panels**



**Cylindrical storage tank**



**Cylindrical hot water tank**



You may use the following formulae:

**Area of a rectangle = length  $\times$  breadth**

**Volume of a cylinder =  $\pi \times r^2 \times h$  where  $r$  = radius,  $h$  = height and using  $\pi = 3,14$**

Mrs Ntanzi was told that she needed solar panels with an area of 2 m<sup>2</sup> for the first two members in her household and thereafter an area of 0,7 m<sup>2</sup> for each additional member.

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9. Determine the total length (L) of the solar panels needed by Mrs Ntanzi if the breadth (B) is 1,5 m. (6)


The hot water tank on the roof has a volume of 150 l and a height (h) of 1,2 m. Calculate (to the nearest cm) the length of the radius of the tank if  $1 \text{ l} = 1\,000 \text{ cm}^3$  (6)


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Jake's Plumbers and Electricians normally charge R12 490 to supply and install the solar geyser. They offered a discount of R4 500 on the type of geyser Mrs Ntanzu ordered. Mrs Ntanzu currently pays an average of R888,83 per month for electricity. She calculated that 45% of her electricity usage is for water heating. She states that if she can save 45% on her monthly electricity bill, she will be able to recover the cost of the solar geyser within two years. Determine whether Mrs Ntanzu's statement is valid. Justify your answer, showing ALL relevant calculations. (6)


10

Mr Gys and his friends are planning on going camping one weekend. They will use a tent, as shown in the picture below. The base of the tent is rectangular with a length of 380 cm and a width of 265 cm.

They need to buy a groundsheet to place underneath the tent. (A groundsheet is a single piece of thick plastic which is placed on the ground underneath the base of the tent.)



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10. Determine the scale used if the width of the tent in the picture is 45 mm. Give the scale in the form:

1 : ... (3)


Rolls of the thick plastic are sold as follows:

- 2 m wide plastic costing R20,99 per metre, including VAT
- 6 m wide plastic costing R44,99 per metre, including VAT

These rolls of plastic are sold in metre lengths only.

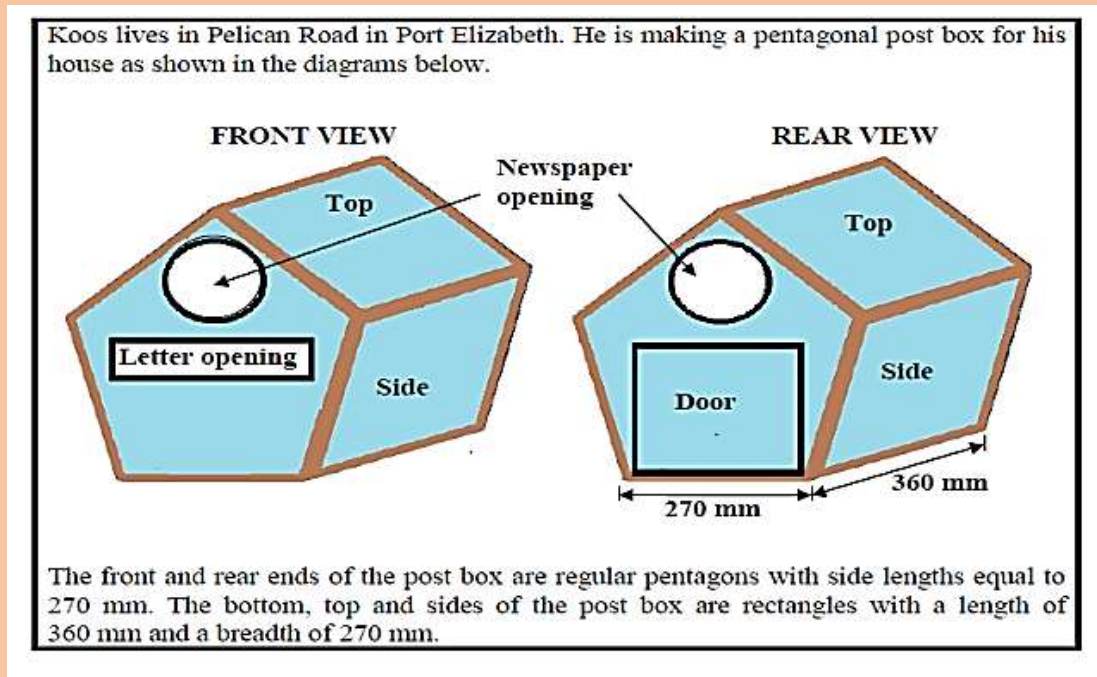
Alternatively, sheets of plastic can be cut to order and cost R12,24 per square metre, excluding VAT. VAT is value-added tax calculated at 14%.

Calculate the cost of the groundsheet for the tent if the most economical option is to be chosen. (9)


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11



11 Calculate the perimeter of ONE of the pentagonal ends of the post box. (2)


11.2 Calculate the total surface area ( in  $m^2$  ) of the post box (excluding the openings for the newspaper and letter), if the following are given: (5)

SHAPE	AREA
Pentagon	$0.13 m^2$
Letter opening	$0.017 m^2$
Newspaper opening	$0.013 m^2$


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11.3 A newspaper folded into a cylindrical shape has a diameter of 12 cm. The area of the newspaper opening of the post box is 0,013 m.

Show, with calculation, whether the folded newspaper will fit in the newspaper opening of the post box


Franz is a citrus farmer in Zebediela, Limpopo. He supplies oranges to the local and export market.

The harvesting of oranges requires various phases. Oranges are first hand-picked and collected into cylindrical baskets. The baskets are then emptied into a trailer to be transported to the packing house.

Franz also has another company that makes orange juice.



Cylindrical section



Consider all oranges to be spherical in shape. The average diameter measurement of an orange is 90 mm.

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12.1 Approximately 2,5 kg of oranges are used to make 1 l of juice. The juice is poured into 5 l plastic bottles. Determine the number of 5 l bottles of juice that can be made from 400 kg of oranges. (3)


12.2 Determine the surface area ( in  $\text{mm}^2$  of an orange) (2)


12.3 Determine the volume ( in  $\text{mm}^3$ ) of an orange (2)


12.4 The cylindrical section of a basket has a height of 25 cm and a diameter of 30 cm. The space in the cylindrical basket not occupied by the oranges is  $113\,040\text{ mm}^3$  Franz states that a basket can hold at most 44 oranges. Verify, by showing ALL the necessary calculations, whether Franz's statement is correct. (7)


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## Calculating elapsed time

### Example

a) School starts at 07:45. You are in class for 2 hours 30 minutes. What time will the bell ring for first break? Give your answer in the 24-hour format.

b) Palesa starts cooking dinner at 6:00 p.m. She has to leave for her choir practice in 1 hour and 45 minutes.

(i) What time must she leave? (Give your answer in the 12-hour format.)

(ii) Convert your answer to the 24-hour format.

c) The bus leaves school at 14:30. It takes 70 minutes to get to Mulalo's house.

(i) What time will he arrive at home? (Give your answer in the 24-hour format.)

(ii) Convert your answer to the 12-hour format.

### Solutions

a) First add the hours:  $07:00 + 2 \text{ hours} = 9:00$  Then add the minutes:  $45 \text{ minutes} + 30 \text{ minutes} = 75 \text{ minutes}$ ,  $75 \text{ minutes} = 60 \text{ minutes} + 15 \text{ minutes} = 1 \text{ hour} + 15 \text{ minutes}$

Calculate the total time elapsed:

$$9:00 + 1 \text{ hour } 15 \text{ minutes} = 10:15$$

So the bell will ring for break at 10:15.

b) (i) First add the hours:  $6:00 \text{ p.m.} + 1 \text{ hour} = 7:00 \text{ p.m.}$

Then add the minutes:  $0 \text{ minutes} + 45 \text{ minutes} = 45 \text{ minutes}$

Calculate the total time that will elapse:  $7:00 \text{ p.m.} + 45 \text{ minutes} = 7:45 \text{ p.m.}$

So Palesa must leave at 7:45 p.m.

(ii) To convert this to the 24-hour time format we simply add 12 hours to the time:

$$7:45 \text{ p.m.} + 12 \text{ hours} = 19:45.$$

c) (i) First we break down 70 minutes into hours and minutes.

We know that  $60 \text{ minutes} = 1 \text{ hour}$ .  $70 \text{ minutes} - 60 \text{ minutes} = 10 \text{ minutes}$ , so the bus ride takes 1 hour and 10 minutes.

Now we add the hours:

$$14:00 + 1 \text{ hour} = 15:00.$$

Next we add the minutes:  $30 + 10 = 40 \text{ minutes}$ .

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So Mulalo will arrive home at 15:40.

(ii) To convert our answer to the 12-hour format we subtract 12 hours:

$15:40 - 12 \text{ hours} = 3:40$ . We know that 15:40 is after midday, so Mulalo will arrive home at 3:40 p.m.

### exercise

#### Calculating elapsed time

1. Unathi's father goes to work at 8:00 a.m. He fetches her from school 7 hours and 30 minutes later. What time will he fetch her? Give your answer in the 24-hour format. (1)


2. Lauren finishes her music class at 15:30. It takes her 30 minutes to get home. She then does homework for 50 minutes. Lauren meets her friend 20 minutes after she finishes her homework. What time do they meet? Give your answer in the 12-hour format. (1)


3. Heather starts baking biscuits at 6:15 p.m. The biscuits must come out of the oven at 6:35 p.m. and need to cool for another 20 minutes before they can be eaten.

a) How long will the biscuits be in the oven? (1)


b) What time will they be ready to eat? (Give your answer in the 12-hour format.)(1)

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4. Alison's favourite TV show starts at 20:35. It is forty-five minutes long.

a) What time will it finish? (1)


b) If Alison watches the movie that follows her favourite show and it finishes at 10:50 p.m., how long was the movie (in hours and minutes)? (1)


5. Vinayak is meeting his brother for lunch at 13:15. He also wants to go to the shops before lunch. It will take him 20 minutes to get from the shops to the restaurant where he's meeting his brother. If he leaves home at 10:10 how much time does he have to do his shopping? Give your answer in hours and minutes. (1)


[7]

## Calendars

Calendars are useful tools to help us keep track of events that are going to happen and to plan our lives accordingly. We can add information to them about important events and dates (like birthdays and school holidays). We can read off days, weeks and months on a calendar and do conversions between these units of time.

You may have come across a time conversion that states that 4 weeks is approximately equal to one month. This is not quite correct. 4 weeks is equal to 28 days, but the months (except February!) have 30 or 31 days in them. When working with calendars, be careful to count the right number of days in a particular month!

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### Example

Jess's calendar for the month of May is given below. Study it carefully and answer the questions that follow.



The calendar for May 2013 is as follows:

MON	TUES	WED	THURS	FRI	SAT	SUN
		1 Workers' Day	2 Dad's birthday	3	4	5
6	7 Netball match	8	9	10	11	12 Mother's Day
13	14	15	16	17 School camp	18 School camp	19 School camp
20	21	22 Maths Lit test	23	24	25 Granny comes to visit	26
27	28	29	30	31		

- a) If it is Monday 6 May, calculate how many days it is until:
- Mother's Day
  - Jess goes on her school camp
  - Jess's granny comes to visit.
- b) If it is 8 May:
- How many weeks does Jess have to study for her Mathematical Literacy test?
  - How many days does she have to study for the test?
  - How many days ago was her dad's birthday?
- c) Will Jess go to school on 1 May? Give a reason for your answer.
- d) Jess needs to buy a present for her mother for Mother's Day. If she has plans with friends on 11 May, by when should she have bought the present?
- e) Jess is invited to a party on Saturday 18 May. Will she be able to attend?
- f) Jess wants to bake a cake for her granny but has plans with a friend for the morning of 25 May.

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- (i) If her granny arrives in the evening of 25 May, when should Jess bake the cake?  
(ii) Given that she's busy on the morning of 25 May, when should Jess make time to buy the ingredients for the cake?

### Solutions

- a) (i) 6 days (ii) 11 days (iii) 19 days  
b) (i) 2 weeks (ii) 14 days (iii) 6 days ago  
c) No. 1 May is Workers' Day which is a public holiday.  
d) Jess should buy a present for her mother by Friday 10 May.  
e) No. She will be away on her school camp.  
f) (i) On the afternoon of Saturday 25 May.  
(ii) On or before Friday 24 May.

### Timetables

#### Example

Look at the timetable below and answer the following questions.

	SABC 1	SABC 2	SABC 3	e-TV
5:30 p.m.	Siswati/Ndebele News	News	Days of Our Lives	It's My Biz
6:00 p.m.	The Bold and the Beautiful	Leihlo La Sechaba		eNews Early Edition
6:30 p.m.	Zone'd TV	7de Laan	On The Couch	Rhythm City
7:00 p.m.	Jika Majika	Nuus	News	eNews Prime Time
7:30 p.m.	Xhosa News	American Idol	Isidingo	Scandal!
8:00 p.m.	Generations		Mad About You	
8:30 p.m.	Shakespeare: uGugu No Andile		News	Welcome to The Parker
9:00 p.m.		Muvhango		

- a) What is the difference in time between the English News at 5:30 p.m. and the English News at 8:30 p.m. (both on SABC 2)?  
b) How long, in minutes, is American Idol?  
c) If Zonke wants to watch Isidingo after dinner at 7:30 p.m., and she needs 90 minutes to cook and eat dinner, what time should she start cooking dinner?

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d) Mandla wants to watch It's My Biz and Generations. He plans to do his homework in between the two shows. If he expects each subject's homework to take 30 minutes, how many subjects worth of homework will he be able to complete between the two shows?

e) Sipho wants to watch the news in English and in Afrikaans, at the same time. Would this be possible? Give a reason for your answer.

f) Why are the blocks on the timetable for SABC 3, blank for 8:30 p.m. and 9:00 p.m.?

g) What is the total time period allocated to the News (in all languages) across all four TV channels?

### Solutions

a) 3 hours

b) 7:30 to 8:30 p.m. = 1 hour = 60 minutes

c) 90 minutes = 1 hour + 30 minutes

7:30 p.m. - 1 hour = 6:30 p.m.

6:30 p.m. - 30 minutes = 6:00 p.m.

d) It's My Biz finishes at 6:00 p.m. and Generations starts at 8:00 p.m. This gives Mandla 2 hours to do his homework. 2 hours = 120 minutes.  $120 \text{ minutes} \div 30 \text{ minutes} = 4$  So Mandla will be able to do homework for four subjects in between the two shows.

e) Yes, there is the English News on SABC 3 at 7:00 p.m. and on SABC 2 there is the Afrikaans Nuus at that same time. However, he cannot watch two channels at the same time. He would need to choose a channel to watch.

f) They are blank because the program "Welcome to the Parker" is still showing.

g) There are 8 sets of news slots appearing on the timetable. Each slot is 30 minutes. Therefore, a total of 4 hours of news will be shown between 5:30 p.m. and 9:00 p.m. on four channels.

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### Activity

Sipho and Mpho are brothers. Their parents require them to do household chores every day. These chores need to fit into their school sports and homework timetables. Using the information provided in the table below, construct a timetable for each brother for one day of the week. The two brothers' timetables need to be clearly laid out and easy to read.

<b>SIPHO</b>	<b>MPHO</b>
Soccer practice 15:30 - 16:30	Music lesson (1 hour)
Feed the dogs	Walk the dogs for a minimum of 30 minutes
Wash the dishes	Study for Maths test - 45 minutes
Complete his Life Orientation task - 45 minutes	Set (and clear) the table before and after dinner
Watch the news at 19:00 for his history assignment	Look through the newspaper for any information on natural disasters for his geography homework.


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## Exercise

### Revision ( measurement)

#### LEARNER NOTES:

- In Mathematical Literacy most of the calculations are based on direct proportion (when you buy MORE apples, you will pay MORE money)
- These questions can sometimes be very short BUT remember when the question is worth more than ONE mark, you are required to show STEPS.
- Although some of the memoranda attached to your learner notes state you can have all the marks for ANSWER ONLY, this changed with CAPS and there will no
- Any conversions in which the metric system is used, you must know the relationships from memory. So do learn these well.
- When doing conversion between different systems the conversion factors or tables will be given.
- Conversions are a basic skill and is used in finances, data, measurement and map work.
- When using formulae we have some definite rules.
- A formula has a left hand side, an equal sign and a right hand side.
- The complete formula must be written down, and NOT only the right hand side of the equation.
- The substitution that has to be done, MUST be shown, the best is to always write them in brackets.
- Using CAPS a lot of formulae such as area and volume will not be given any more and you will have to learn them by heart.

1.1 10 ml of sugar weighs 8 g. Calculate the weight of 245 ml of sugar. (2)


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1.2 A few weeks after the swimming competition, an Australian tourist who had been a spectator at the competition deposited 1 500 Australian dollars (AUD\$) into the club's bank account as a donation. The bank converted this amount to rand as R14 595,00. Calculate the exchange rate, in rand per AUD\$, used by the bank. (2)


1.3 The scale used on the layout plan is 1 : 58.  
Calculate the actual length of the table on the layout plan if its scaled length is 2,26 cm. (2)


1.4 Approximately 2,5 kg of oranges are used to make 1 l of juice. The juice is poured into 5 l plastic bottles. Determine the number of 5 l bottles of juice that can be made from 400 kg of oranges. (3)


1.5 Convert 450 metres to kilometres. (2)


1.6 Write 5,34 million as an ordinary number. (1)


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1.7 Calculate the price per egg if half a dozen eggs cost R7,92. (2)


1.8 Convert 18 gallons to litres where **1 gallon = 4,546 litres**. (2)


1.9 Determine the cost of 15,76 litres of fuel if fuel costs R9,92 per litre. (2)


1.10 Convert 1 260 seconds to hours. (2)


1.11 Determine the price per gram (rounded off to the nearest cent) if 200 g of peanuts cost R9,96. (2)


1.12 Convert  $\frac{3}{4}$  cup to millilitres. 1cup=250ml (2)

--

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1.13 Convert 5 ounces to grams. 16 ounces = 480g (2)


1.14 Thabo bought goods in Ghana to the value of 1 345 cedi. 1 cedi = 4.41 ZAR. Calculate the value, in rand, of the goods Thabo had bought. (2)


1.15 Determine the total length, in miles, of the South African coastline if the coastline of the Eastern Cape is approximately 500 miles long. The East Coast measures 800km and the South African coastline is 2798km. (3)


1.16 Annie measured the length of the coastline of South Africa on her map and found it to be 223 mm long. The coastline is 2798km in real life. Determine the scale of the map in the form 1 : ... Round off the answer to the nearest hundred thousand. (4)


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**QUESTION 2:**

2.1 The time (in seconds) taken by a moving object to cover a distance of 50 m is given by: Time (in seconds) =  $\frac{d}{s}$

Where:  $s$  = average speed in metres per second

$d$  = distance in metres

Calculate the time taken if the object is moving at an average speed of metres per second. (2)


2.2 The total value of the demo toys that children can play with is currently R15 000 and the depreciation rate is 17,5% per annum. Thandeka uses the straight-line depreciation method to determine the value of the demo toys. Calculate the depreciated value of the demo toys at the end of 4 years.

Use the formula  $A = P(1 - i \times n)$

where  $A$  = the depreciated value       $P$  = the present value

$i$  = the annual depreciation rate       $n$  = the number of years (3)


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2.3 The inside measurements of the walls of the pool are as follows:

Length = 50 m, breadth = 25 m and height = 1,5 m The inside walls and the floor of the pool need to be repainted. Determine the total area of the pool that will be repainted. Use the following formula:

$$\text{Area to be repainted} = l \times b + 2h(l + b)$$

$$\text{where } l = \text{length} \quad b = \text{breadth} \quad h = \text{height} \quad (3)$$


2.4 Calculate the height of the water in the pool if the volume of water in the pool is 1 500 m<sup>3</sup>. Use the following formula:  $\text{height of a rectangular prism} = \frac{\text{volume}}{\text{length} \times \text{breadth}}$   
(2)


2.5 The temperature of the water in the pool needs to be maintained at 22 °C. The temperature gauge used shows the temperature in degrees Fahrenheit (° F). Convert (rounded off to the nearest degree) 22 °C to degrees Fahrenheit.

Use the following formula:

$$\text{Temperature (in } ^\circ\text{F)} = 32 + 1,8 \times (\text{Temperature in } ^\circ\text{C})$$

Determine the following bearing in mind that the average diameter of an orange is 90mm. Surface area ( in mm<sup>2</sup> ) of an orange (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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2.6.1 Volume ( in mm<sup>3</sup> ) of an orange. (2)

The following formulae may be used:

$$\text{Surface area of a sphere} = 4 \times \pi \times r^2$$


2.6.2 Volume of a sphere =  $\frac{4}{3} \times \pi \times r^3$

where  $\pi = 3,14$  and  $r = \text{radius}$  (3)


2.7 The cylindrical section of a basket has a height of 25 cm and a diameter of 30 cm. The space in the cylindrical basket not occupied by the oranges is 113 040 mm<sup>3</sup>. Franz states that a basket can hold at most 44 oranges. Verify, by showing ALL the necessary calculations, whether Franz's statement is correct. The following formula may be used: Volume of a cylinder =  $\pi \times r^2 \times h$  The average diameter of an orange is 90mm

where  $\pi = 3,14$ ,  $r = \text{radius}$  and  $h = \text{height}$  (7)


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### USING FORMULAE

- ✓ Always always write down the complete formula.
- ✓ Even when a formula is given, the whole formula must be rewritten in the test or exam.
- ✓ When doing the substitution, do use brackets.
- ✓ Formulae are usually for the calculation of something with a UNIT. Do write down the units after the answer. It does not always count a mark, but sometimes it does, and you must not throw valuable marks away

#### Exercise

1.1 Convert 23,005 litres to millilitres. (2)


1.2 Determine the total price of 2,5 kilograms of meat costing R63,99 per kilogram. (2)


1.3 Convert R3 850 to euros (€) if the exchange rate is €1 = R10,2584. (2)


1.4 Calculate the petrol consumption (in litres per 100 km) if Mr De Haan covered a distance of 325 km using 12,5liters of petrol. (2)


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1.5 The distance measured on the map from Mr De Haan's house to the entrance of the Bayview Hospital is 8,9 cm. Calculate the actual distance (in km) if 1 cm on the map represents 0,3 km. (2)


1.6 Convert the 6 inches height of the box in centimeters if 1 inch = 2,5 cm. (2)


1.7 The length of the Jetstream in the picture is 9,9 cm, while its actual length is 19,25 m. Determine the scale (rounded off to the nearest 10) of the picture in the form **1: ...** (4)


1.8 A **nautical mile** is a unit of measurement based on the circumference of the earth. 1 nautical mile = 1,1507 miles = 6 076 feet = 1,852 kilometres  
Calculate the maximum operating altitude (to the nearest nautical mile) of the Jetstream, that has a maximum operating altitude of 25 000 feet. (3)


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**QUESTION 2:**

2.1 A spin wheel is divided in 24 equal parts The wheel has a radius of 60 cm.

(a) Calculate the circumference of the wheel.

Use the formula:

**Circumference of a circle =  $2 \times \pi \times \text{radius}$ , using  $\pi = 3,14$  (2)**


(b) Calculate the area of ONE of the sectors of the wheel.

Use the formula: area of a sector of a circle =  $\frac{\pi r^2}{n}$

where  $\pi = 3,14$  and  $n$  = number of sectors (3)


2.2 Kedibone has a cheque account with Iziko Bank. The bank charges a service fee up to a maximum of R31,50 (VAT included) on all transaction amounts.

**TABLE 2 below shows five different transactions on Kedibone's cheque account.**

NO.	DESCRIPTION OF TRANSACTION	TRANSACTION AMOUNT (IN R)	SERVICE FEE (IN R)
1	Debit order for car repayment	4 250,00	31,50
2	Debit order for cell phone contract	344,50	A
3	Personal loan repayment	924,00	14,59
4	Vehicle and household insurance	B	11,85
5	Cheque payment	403,46	8,34

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

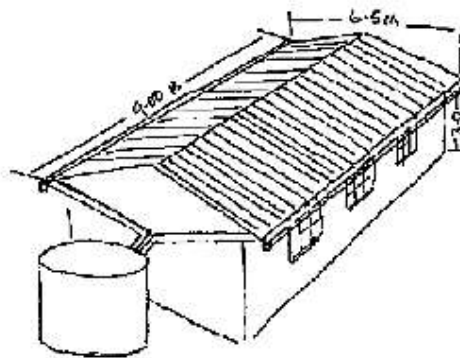
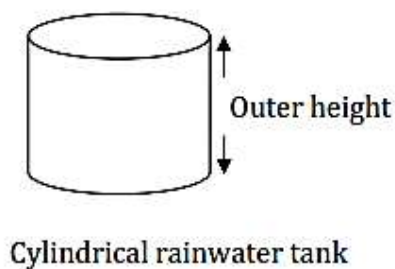
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2.1 Calculate the missing value A, using the following formula:

$$\text{Service fee (in rand)} = 3,50 + 1,20\% \text{ of the transaction amount} \quad (3)$$


2.3

Jabu Ndou requires a cylindrical water tank to collect rainwater from his roof. This water will be used for irrigating his garden.



2.3.1 Jabu wants to know how much rainwater the tank can hold. The inner radius of the tank is 0,998 m and the inner height of the tank is 2,498 m.

(a) Calculate the total volume, rounded off to THREE decimal places, of the water tank. Use the formula:

$$\text{Volume of a cylinder} = \pi \times (\text{radius})^2 \times \text{height}, \quad \text{and using } \pi = 3,14 \quad (3)$$


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(b) Determine the height, rounded off to THREE decimal places, of the water in the tank when it is 80% full. (2)


2.3.2 The outside walls and roof of the rainwater tank need to be painted. The outer radius of the tank is 1 m and the outer height of the tank is 2,5 m. Calculate the surface area of the tank that will be painted using the formula:

**Surface area of the tank =  $\pi \times \text{radius} \times (2 \times \text{height} + \text{radius})$ ,**

and using  $\pi = 3,142$  (5)


2.3.3 Suppose the tank filled up at an average rate of 5 mm per minute. Calculate how long it took (in hours) for the water in the tank to reach a height of 1 200 mm, if the tank was initially empty. Use the formula:

$$\text{Time (in hours)} = \frac{\text{height (in mm)}}{\text{average rate (in mm per ho)}}$$


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## Maps, plans and other representations of the physical world

The number scale

- is expressed as a ratio like 1 : 50. This says that 1 unit on the map represents 50 units on the ground. For example, 1 cm on the map will represent 50 cm on the ground and 1 m on the map will represent 50 m on the ground.

NB

*To use the number scale, you need to measure a distance on a map using your ruler or use the distance provided, and then multiply that measurement by the “real” part of the scale ratio given on the map, in order to get the real distance.*

exams

- a) You measure the distance between two buildings on a map to be 10 cm. If the map has a number scale of 1: 40, what is the actual distance in metres on the ground?
- b) You are given a map with the number scale 1: 50 000. You measure a distance of 15 cm on the map. What is the actual distance in km?

### Solutions

a) Scale is 1: 40.

$$10 \text{ cm} \times 40 = 400 \text{ cm} = 4 \text{ m}$$

The distance on the ground (in real life) is 4 m.

b) Scale is 1 : 50000

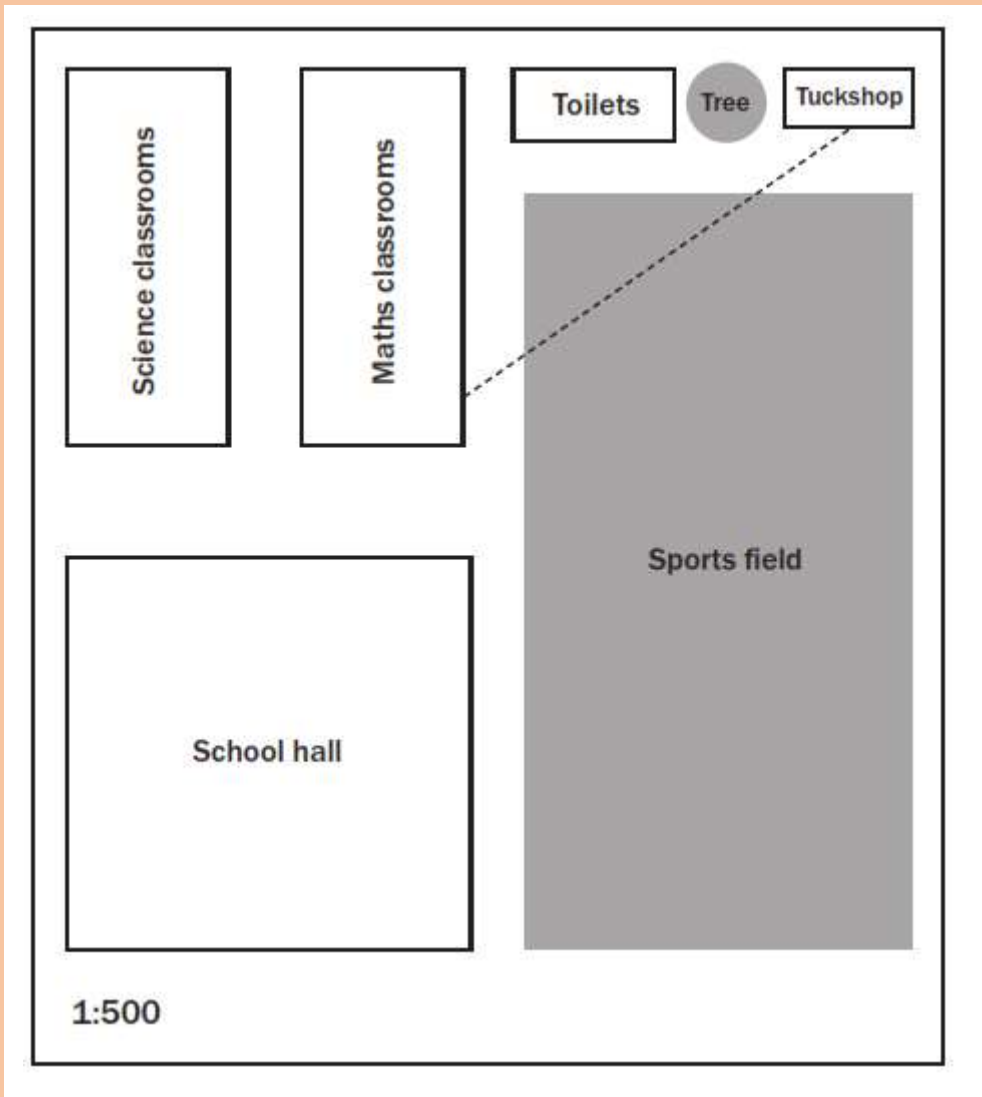
Therefore actual distance is  $15 \text{ cm} \times 50\,000 = 750\,000 \text{ cm} = 7,5 \text{ km}$ .

### Exercise

Study the school map given below and answer the questions that follow.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



1. Use the given scale to calculate the following real dimensions of the sports field in metres:

a) width (4)


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b) length. (4)

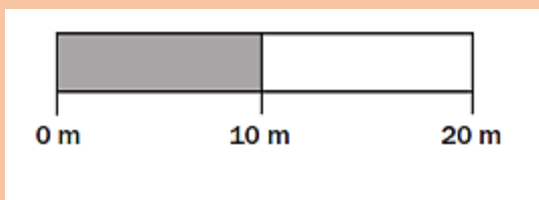

2. Use the given scale to calculate the length of the science classroom block in metres. (2)


3. Zuki walks from the tuck-shop to his maths classroom, along the broken line shown. Measure how far he walked in metres. (2)


[12]

### The bar scale

• is represented like this:



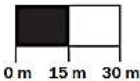
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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- ✓ Each piece or segment of the bar represents a given distance, as labelled underneath. To use the bar scale:
- ✓ You need to measure how long one segment of the bar is on your ruler. You must then measure the distance on the map in centimetres.
- ✓ Calculate how many segments of the bar graph it works out to be (the total distance measured; divided by the length of one segment).
- ✓ Then multiply it by the scale underneath. So, if 1 cm on the bar represents 10 m on ground, and the distance you measure on the map is 3 cm ( $3 \text{ cm} \div 1 \text{ cm length of segment} = 3 \text{ segments}$ ) then the real distance on the ground is  $3 \times 10 \text{ m} = 30 \text{ m}$ .

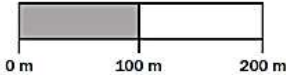
**e.g. Worked example 2**

a) You measure a distance of 10 cm on a map with the following bar scale:



If the bar scale is 1 cm:15 m, what is the actual distance on the ground in metres?

b) You measure a distance of 11 cm on a map with the following bar scale:



If the bar scale is 2 cm : 100 m, what is the actual distance on the ground in metres?

**Solutions**

a) 1 segment on the bar scale = 1 cm on the ruler.  
0,01 m on the ruler represents 15 m on the ground.  
Therefore the scale is 0,01:15.

10 cm = 0,1 m on the ruler represents  $15 \times 10 = 150 \text{ m}$  on the ground.

**OR**

1 segment on the bar scale = 1 cm on the ruler.  
1 cm on the ruler represents 15 m = 1 500 cm on the ground.  
Therefore the scale is 1:1 500.

10 cm on the ruler represents  $1 500 \times 10 = 15 000 \text{ cm} = 150 \text{ m}$  on the ground.

**OR**

Both values must be written in the same units!

Both values must be in the same units!  
Remember your CONVERSIONS!

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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2 segments on the bar scale = 2 cm on the ruler.  
2 cm on the ruler represents 30 m on the ground.

10 cm on the ruler represents  $30 \times 5 = 150$  m on the ground.

b) 1 segment on the bar scale = 2 cm on the ruler.  
2 cm on the ruler represents 100 m on the ground.

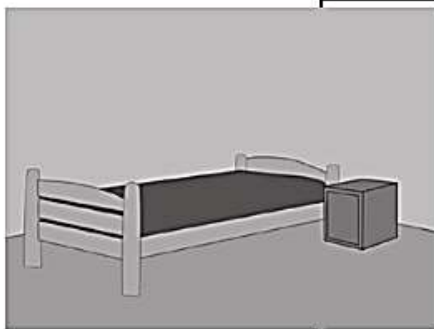
11 cm on the ruler represents  $\frac{100 \times 11}{2} = 550$  m on the ground.

OR

2 segments on the bar scale = 4 cm on the ruler.  
4 cm on the ruler represents 200 m on the ground.

11 cm on the ruler represents  $\frac{200 \times 11}{4} = 550$  m on the ground.

Remember to get rid of the unwanted unit.

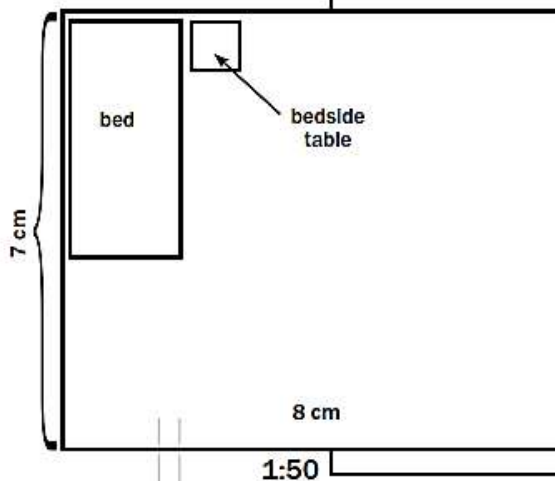


### e.g. Worked example 3

The bedroom in the picture is 3,5 m by 4 m. It has a standard sized single bed of 92 cm by 188 cm. The bedside table is 400 mm square. Draw a floor plan to show the layout of the room. Use the number scale 1 : 50.

#### Solutions

The scale of 1 : 50 means that 1 unit on your drawing will represent 50 units in real life so 1 cm on your drawing will represent 50 cm in real life.



- The width of the room is 3,5 m.  
Convert 3,5 m to cm:  
 $3,5 \times 100 = 350$  cm  
Use the scale to calculate the scaled width on the map:  
 $350 \text{ cm} \div 50 \text{ cm} = 7 \text{ cm}$   
(Divide the actual, real measurement of the room by the 'real number' from the scale.)
- The length of the room is 4 m.  
Convert 4 m to cm:  
 $4 \times 100 = 400$  cm  
Use the scale to calculate the scaled length on the map:  
 $400 \text{ cm} \div 50 \text{ cm} = 8 \text{ cm}$
- The scaled bed is 3,76 cm by 1,84 cm.
- The scaled table is 0,8 cm by 0,8 cm.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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Your school is building a new classroom. The measurements of the classroom are as follows: length of each wall: 5 metres, width of the door: 810 mm, width of the windows: 1 000 mm. Use the appropriate symbols to draw a plan of the classroom using a scale of 1 : 50. (14)


Place a door, 2 windows in one of the walls and 3 windows in the opposite wall. 1. If the school wants to make blinds out of fabric for the classroom windows, and the blinds are the same size as the windows (1 000 mm wide), calculate the total length of material (in metres) that needs to be bought. (2)


2. If the material for the blinds costs R 60 per metre, calculate the total cost of fabric for the blinds. (1)


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3. The school needs to tile the floor of the classroom. Calculate the total area that must be tiled. (2)


4. If the tiles come in 4 m boxes, how many boxes must the school buy? Explain your answer. (2)


5. If the tiles cost R 150 per box, calculate how much the tiles will cost. (1)

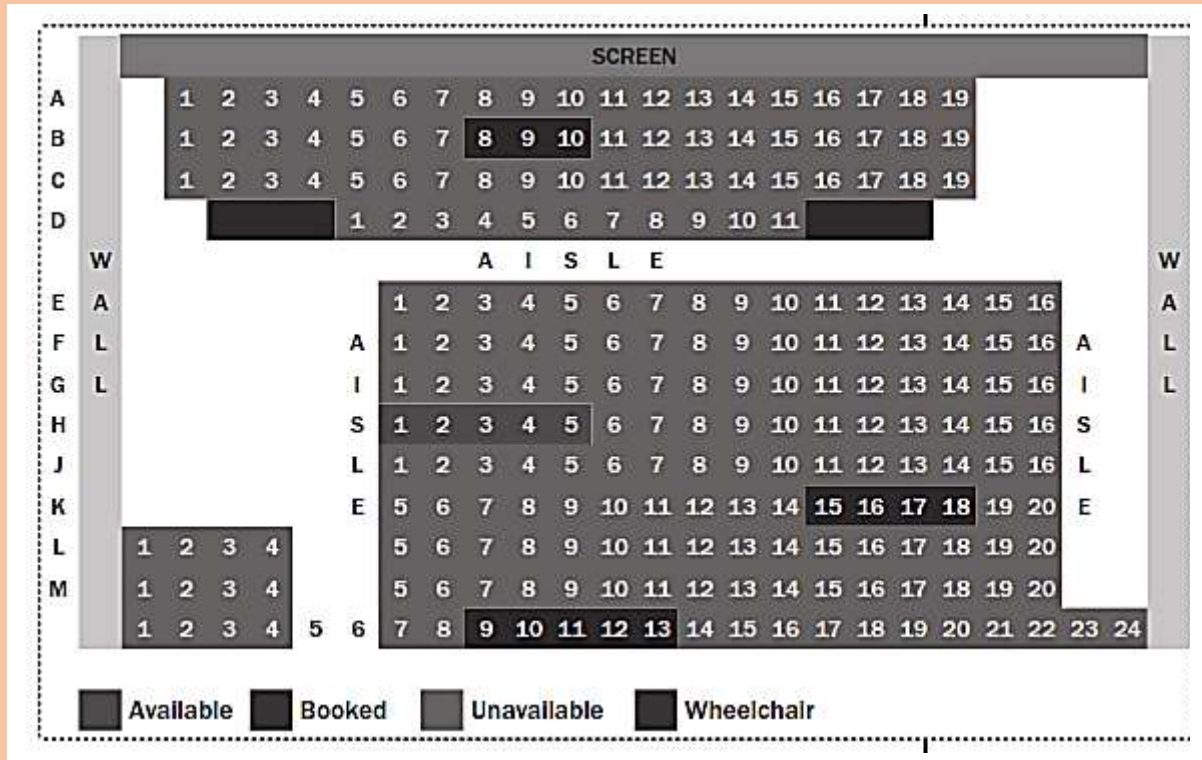

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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Example

Study the cinema seating plan below and answer the questions that follow.



- If you wanted to book seats for a movie, which seats would you want to sit in?
- Are seats N 11 and N 12 available?
- Which seats offer you and your classmates a good view and why?
- You are going to the movies with a friend in a wheelchair. Name one seat where they can sit, and the seat next to it where you can sit with them.
- Where will you sit if you want to have a very close view of the screen?
- What fraction of row B has been booked? What percentage is this?

### Solutions

- H1, H2, H3, H4 or H5.
- No. They are booked.
- Middle section, because it is not too close or too far from the screen.
- For example, the friend could sit in the wheelchair seat next to D1, and you could sit in D1.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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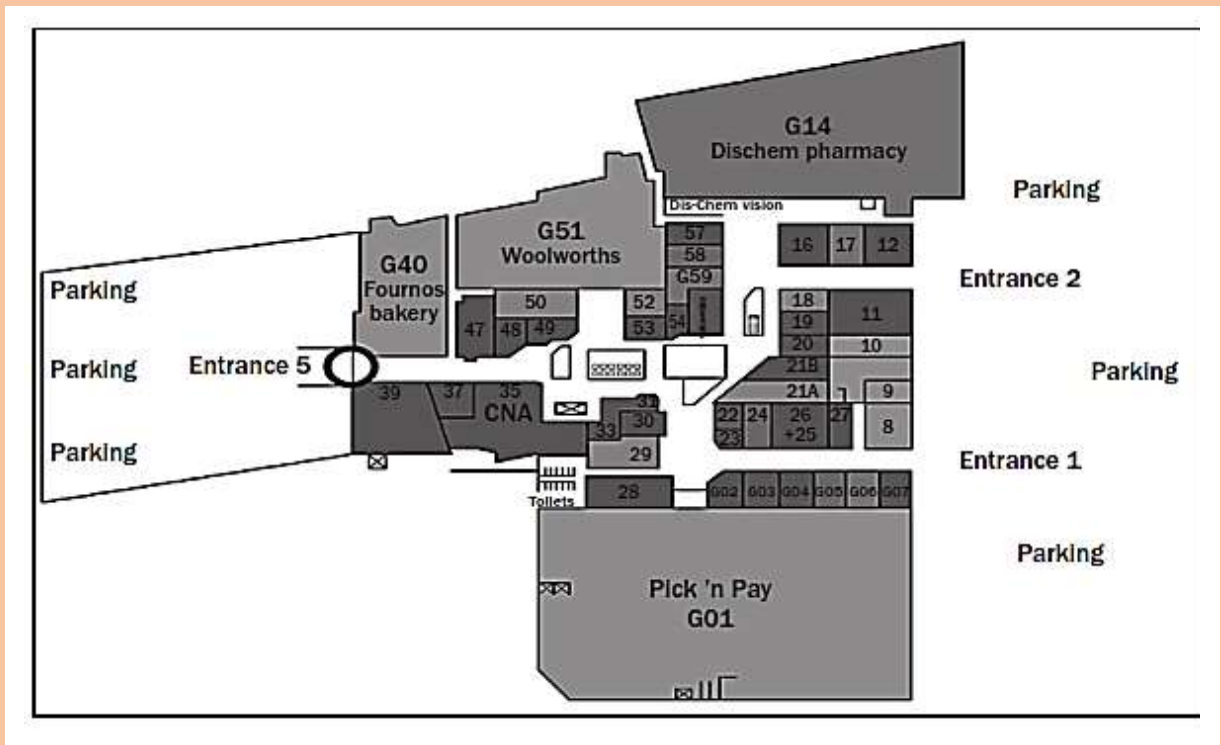
e) Row A.

f)  $\frac{3}{19} = 16\%$

### Exercise

#### Navigating a shopping mall

Study the map of the ground floor of a shopping centre and answer the questions that follow.



1. You want to go to Shop 37 to buy new shoes. What store will you find next to it (1)

2. What does “G51 Woolworths” mean on this map? (1)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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3 Do you think this shopping centre has more than one floor? Explain your answer. (1)


4. Where should you park if you want to go to Fournos bakery to buy some fresh bread? (1)

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5. Name two stores you could buy stationery from and describe how you would get to each of them from Entrance 1. (2)


6. If you are at Entrance 2, explain how you would get to the toilets. (4)


7. You are standing at the entrance of Dis-Chem. Your friend arrives at Entrance 5 and wants to meet you. Give your friend directions to explain where they will find you. (6)


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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

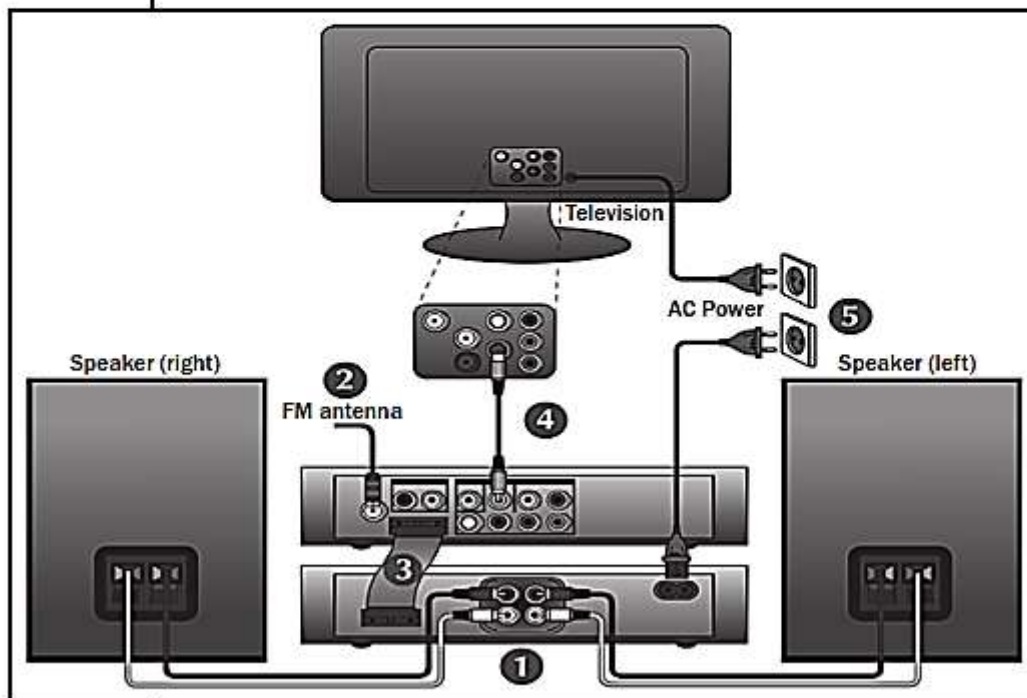
## Plans

Assembly diagrams and instructions

### Example

In the image below, instructions are given in picture form only. Each number on the diagram represents one step in the assembly process. You are given five written instructions below. In the table below, match each written step to the step number you think it describes.

Step number on Image	Statement number/description
Step 1	a) Connect the composite video cable to a TV.
Step 2	b) Connect the speaker cables.
Step 3	c) Connect the power cables of the system and TV to AC power.
Step 4	d) Connect the control cable.
Step 5	e) Connect the FM antenna.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Solution	
Step number on Image	Statement number/description
Step 1	b) Connect the speaker cables.
Step 2	e) Connect the FM antenna.
Step 3	d) Connect the control cable.
Step 4	a) Connect the composite video cable to a TV.
Step 5	c) Connect the power cables of the system and TV to AC power.

### Example

In a group, study the images below showing how to insert a cellphone's SIM card and battery, and write a description of each step, based on the images.



### Solutions

Step 1: Place your fingernail in the cover release opening, lift the back cover of the phone up (1) and pull it back (2) to remove it.

Step 2: Lift out the battery by slipping your finger under the side and lifting it up (1) and out (2) of the phone.

Step 3: Slide the SIM card into the SIM card socket inside the phone. Make sure that the card's gold contacts face downwards.

Step 4: Replace the battery by slipping it back into the phone (1) and pressing it down (2).

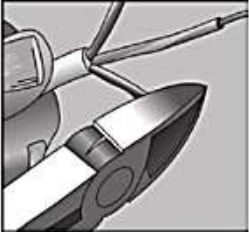
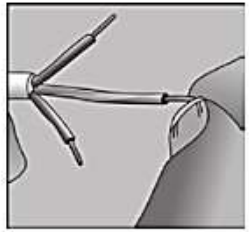


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise





Instructions for wiring a plug

Study the assembly instructions given below to wire a plug and answer the questions that follow.

	<p>1. Using pliers, carefully bare the ends of the three wires inside the electrical cord for about half a centimetre, by cutting away the plastic insulation.</p>
	<p>2. Gently twist the strands of copper wire with your fingers until each strand is tight.</p>
	<p>3. Remove the new plug cover by either "snapping" it open or unscrewing it.</p>
	<p>4. Unscrew the little screws on each of the plug's prongs.</p>

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

	<p>5. Insert the twisted copper wires into the holes in the prongs. The green and yellow wire must always be inserted into the top (largest) prong. The blue wire is inserted into the left prong (sometimes marked with a blue spot or the letter N). The brown wire is inserted into the right prong (sometimes marked with a brown spot or the letter L).</p>
	<p>6. Tighten the little screw on each of the plug's prongs.</p>
	<p>7. Make sure the electrical cord is firmly gripped by the arrester clips at the bottom of the plug.</p>
	<p>8. Replace the cover of the plug.</p>

1. What colour wire must be inserted into the top prong? (1)


2. What colour wire must be inserted into the left prong? (1)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3. What colour wire must be inserted into the right prong? (1)


4. What is the main difference between a 2 prong plug and a 3 prong plug? (2)


5. Why do you think it is important to wire an electrical appliance correctly? (1)


[6]

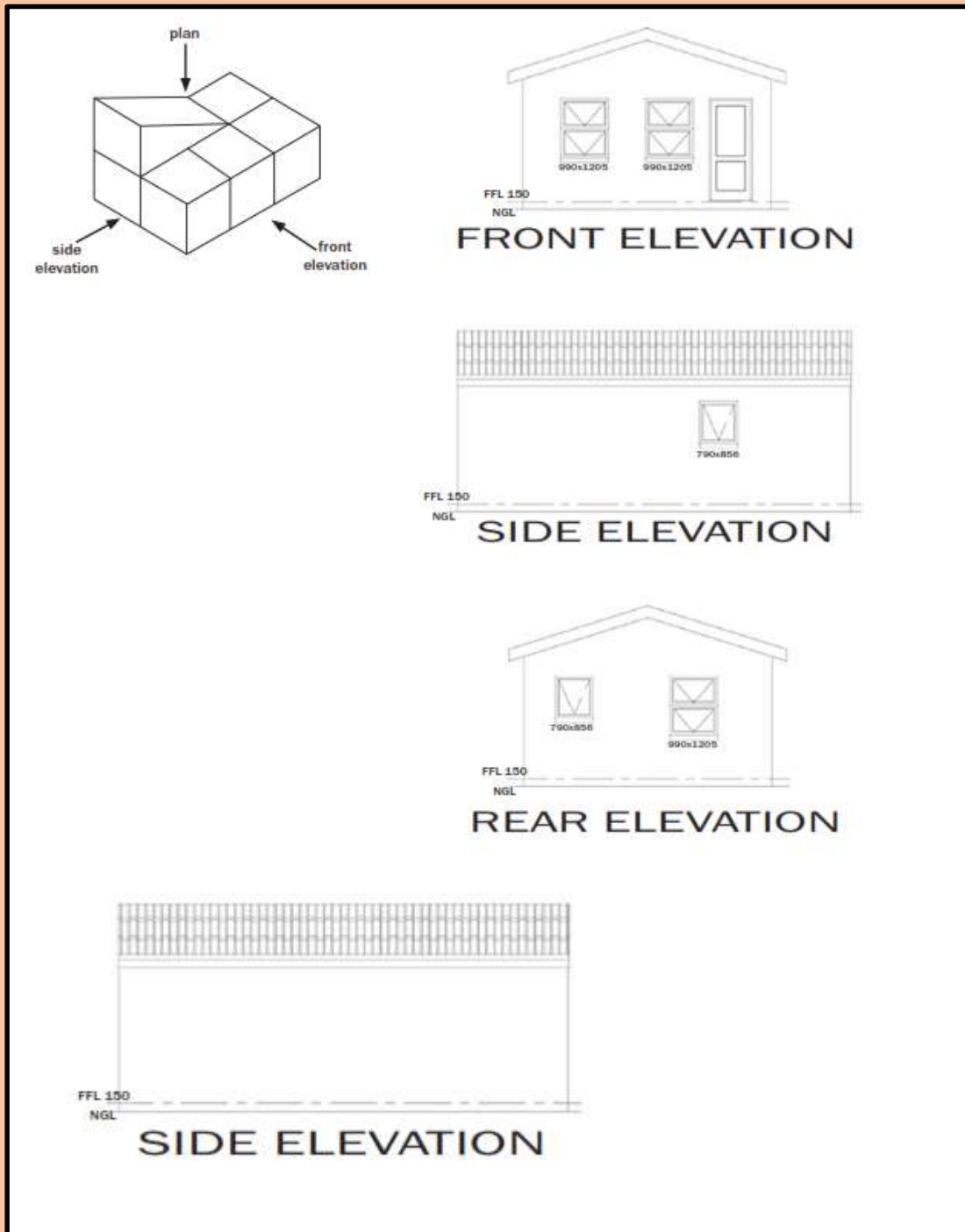
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Plans and elevations

An elevation shows the front, back or side view of a building.

For example, the elevations of a building could look like this:

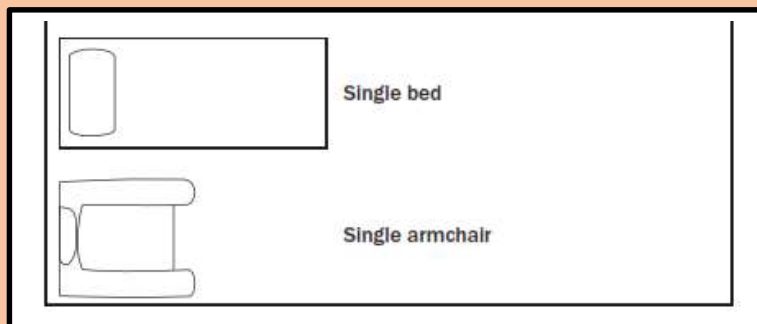
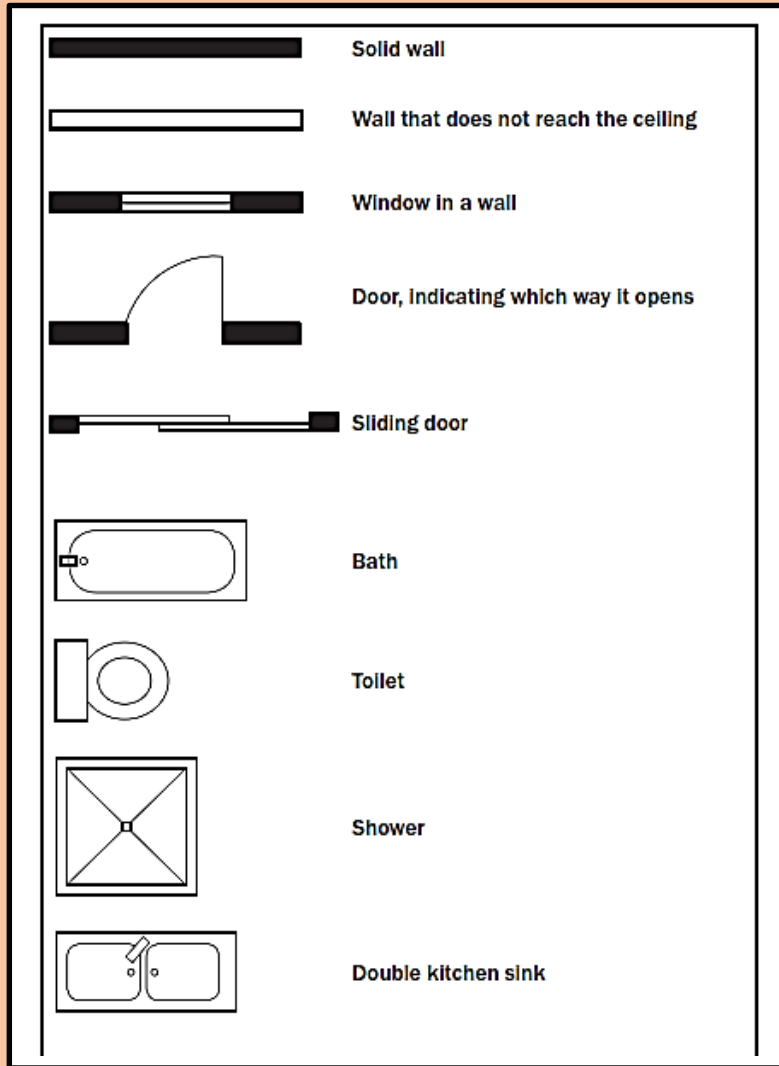


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Symbols on a floor plan

It is important to understand the layout of floor plans. In order to do this, we can use a key (or legend) that describes the symbols most commonly used on floor plans, as in the key given below. Sometimes the symbols might look slightly different.

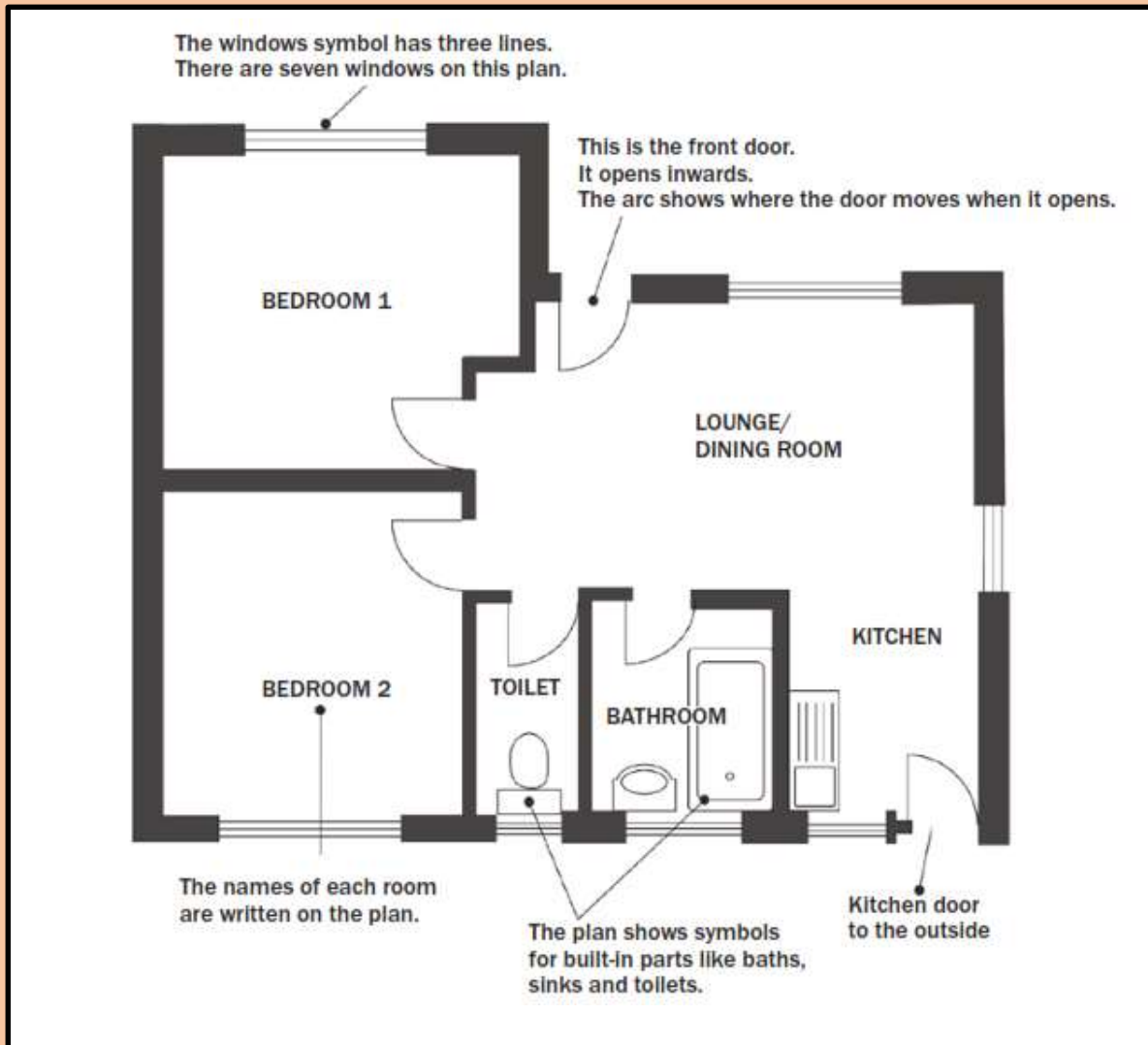


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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Reading floor plans

There is a lot of information on a floor plan. Study at the diagram below to understand all of the given information.



The floor plan is drawn as if the roof has been lifted off and you're looking down into the building from the top. Identify the front entrance to the house: imagine opening the front door and walking into each room on the floor plan. Doors and windows are two of the most important parts shown on a floor plan.

Windows are shown with three parallel lines in a wall.

Doors are typically shown as a straight line perpendicular to a wall and an arc that connects this line to the wall. This shows which side has the hinges and which room the door opens into.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

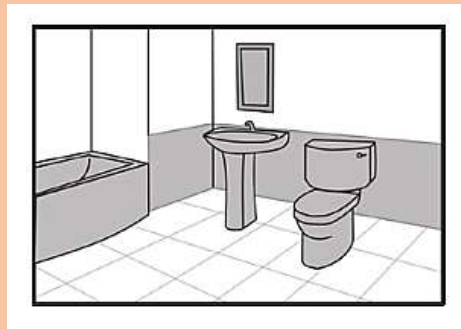
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

The baths, sinks and toilets are shown on the plan, because they are put in when the house is built. They are called fixtures. This means they are built in and can't be moved like we move furniture around.

### Drawing a floor plan

#### Example

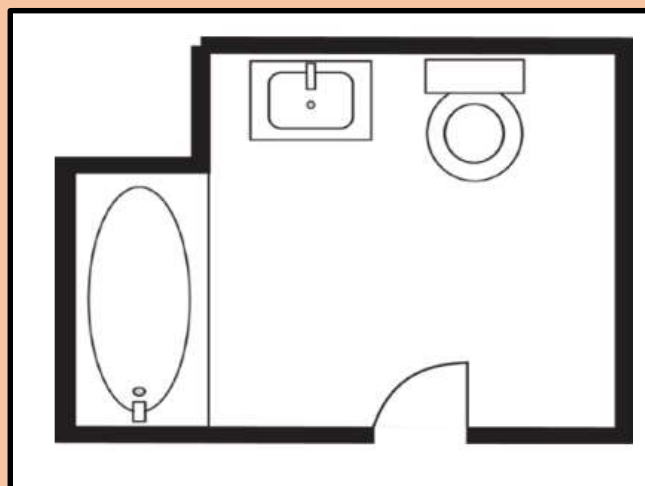
The diagram below is an illustration of a part of the bathroom. No windows or doors are shown. The two walls that aren't visible in the illustration are inside the house.



Use appropriate symbols to draw a rough floor plan of the room in the illustration.

- The plan does not have to be drawn to scale.
- Add a door and a window to your floorplan in any place you think is appropriate.

#### Solution



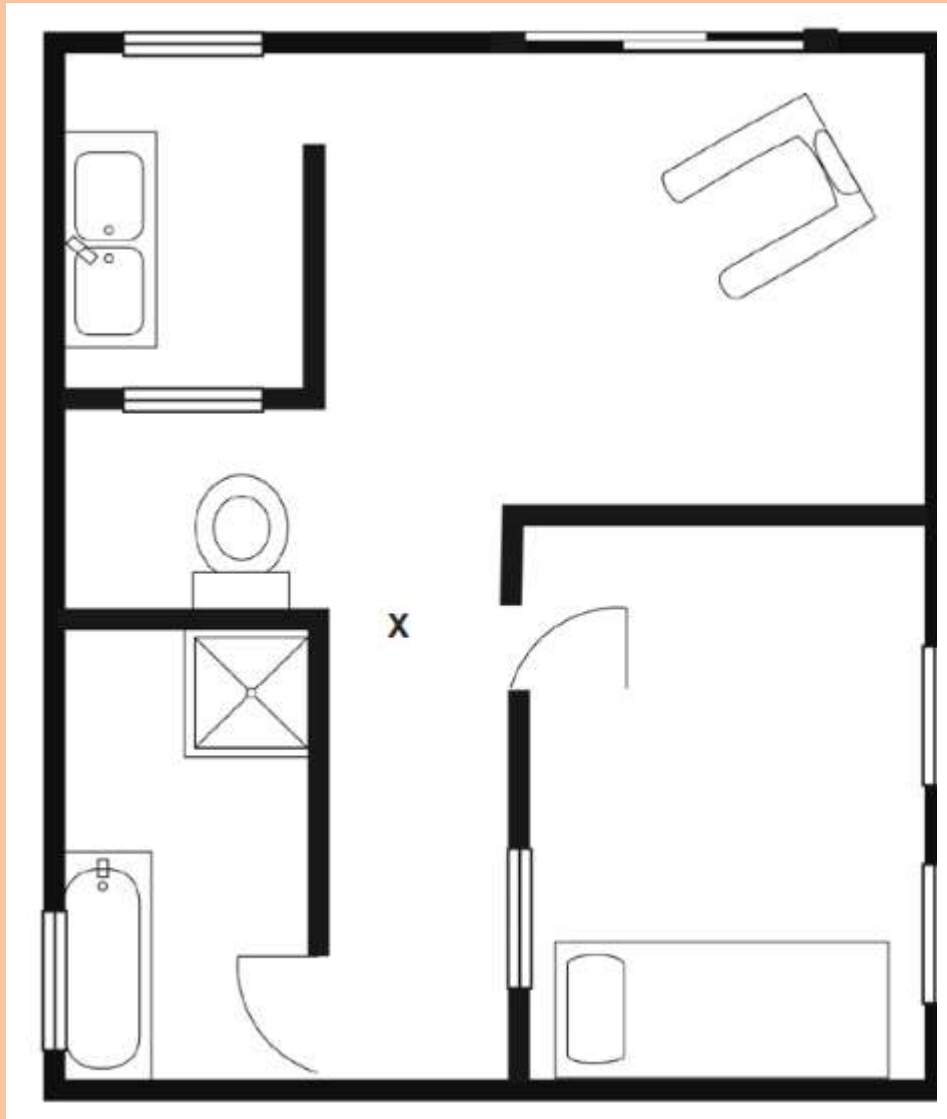
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

#### Interpreting a floor plan

Consider the floor plan of a townhouse given below. It contains some errors. Identify as many as you can, and state why each is an error. [20]



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- The kitchen has a window on the north wall rather than the west wall, meaning that the room will be dark ✓ and there is not enough room for wall cupboard units ✓. As there is a window on the south wall as well, the cupboards can only be above and below the sink ✓, so a person working at the sink will be uncomfortable with the cupboard right in front of their face ✓. The sink also is not in a corner ✓, meaning that there is wasted space in the south of the room ✓, because there's not enough space for a fridge or cupboard there ✓. Furthermore, the placement of the door into the room makes it impossible to put any cupboards on the north wall anyway. ✓ The door into the kitchen is just an opening, which is normal in modern houses.
- The toilet is not against a wall which contains water pipes ✓; toilet pipes always run up the exterior (west, in this case) wall, meaning that the toilet won't work ✓. Furthermore, the toilet does not have a door, which is inappropriate. ✓ Lastly, it is inappropriate to have a window into the toilet from the kitchen ✓. The toilet window is always above the toilet to the outside of the building (with frosted glass). ✓
- The bathroom places the shower in the north-east corner, which means that a pipe to supply hot water would have to run down from the roof in a wall there ✓, which would be risky if someone drilled into the wall to hang a shelf, as it would be hard to guess where the pipe was ✓. Furthermore, a long cold-water pipe will have to run from the west exterior wall to the shower ✓, raising costs ✓ and the same risk of a later accident if the home owner hangs a shelf or cupboard. The shower should probably be on the west wall as well. ✓ The door to the bathroom opens the wrong way ✓; it should open against the south wall ✓. Furthermore, the passage is a waste of space ✓; the bathroom could be bigger and nicer ✓ if the passage was removed and a door into the bathroom was placed where the passage currently starts (next to the bedroom door, marked "X" on the plan).
- The sliding door in the lounge is on the north wall. This is correct, since houses in the southern hemisphere should be north-facing to get sunlight all day into the living spaces. However, there is a large wall on the west wall which should have a window in it to let in more light. ✓
- There is no entrance door into the building apart from the sliding door. ✓ It is conventional to have one into the kitchen ✓ so that laundry can be taken out back rather than through the house.
- The door in the main bedroom does not open correctly at all and/or is not placed correctly ✓. There are no cupboards in this room ✓; they should be on the north wall (of this plan) ✓. There is a window into the passage ✓; this defeats the privacy of the bedroom (you don't want people in the passage looking through a window onto your bed). ✓

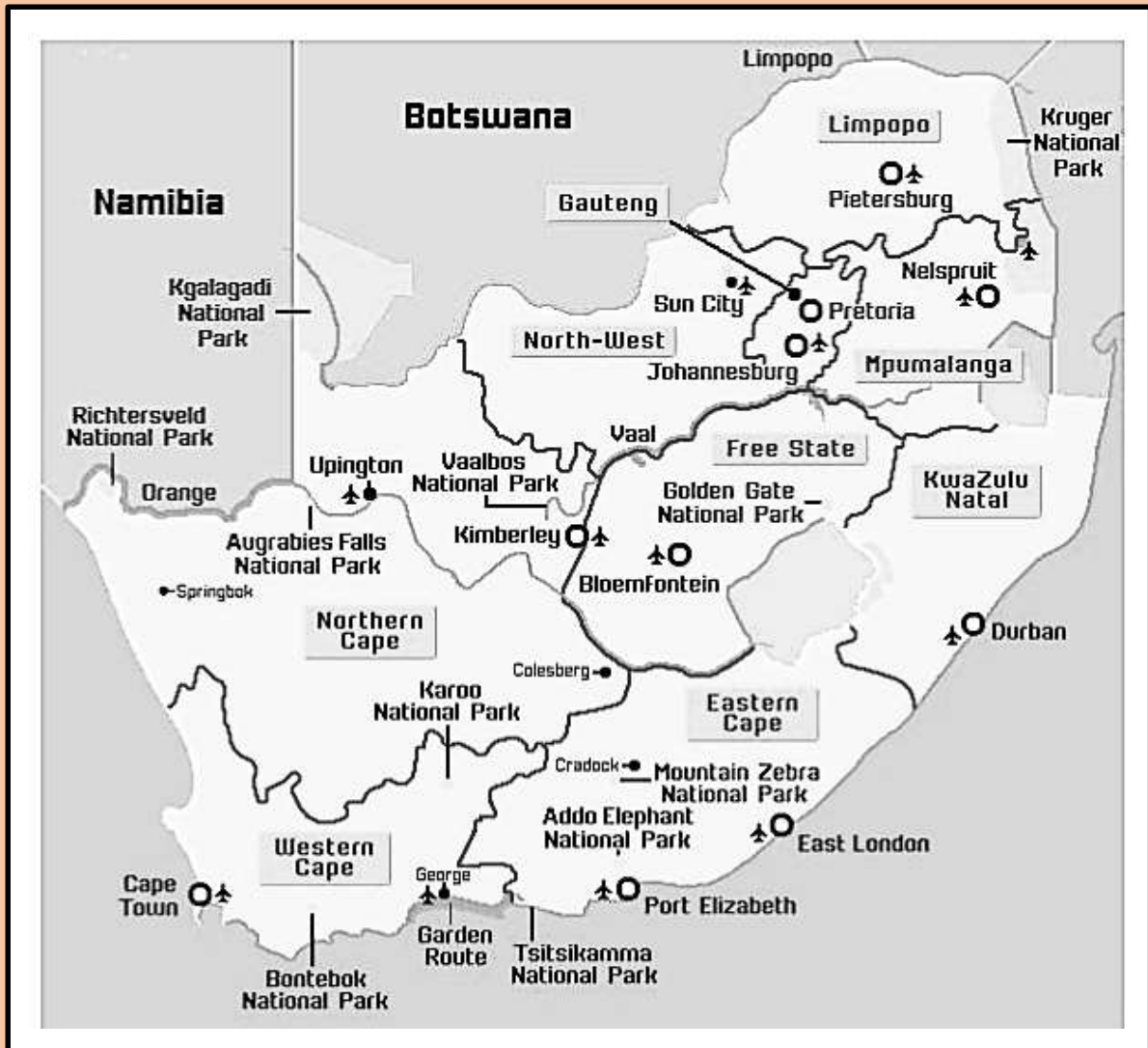
- Generally, the orientation of the house is wrong. ✓ The water pipes and water-using rooms (bathroom, kitchen, toilet), should be on the south side ✓, and the bedroom on the north side ✓, so that the bedroom is more cheerful with light all day. ✓

[Any 20]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise



Use the map to answer the following questions:

Mr Coetzee uses the map above to plan his holiday trips between different parks:

1.1 Write down the grid reference for the Vaalbos National Park. (2)


1.2 Which national parks are situated in the Western Cape? (2)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.3 In which general direction is Kimberley from East London? (2)


1.4 It took Mr Coetzee 30 minutes to fly the distance of 153 kilometres between Kimberley and Bloemfontein. Calculate the average speed in kilometres per hour. (3)

Use the formula: Average speed  $\frac{\text{distance travelled}}{\text{time taken}}$

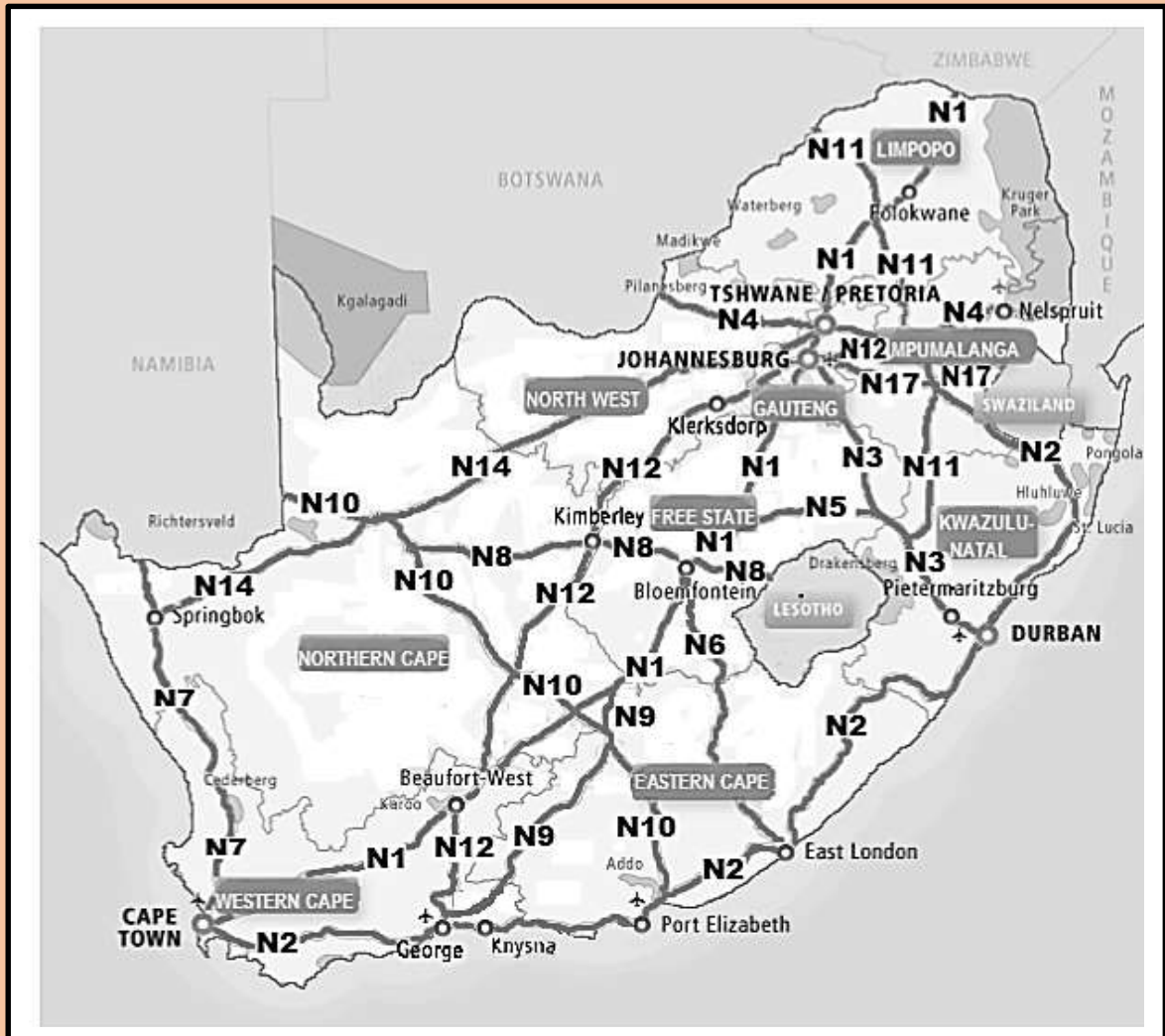

### Question 2

The Nel family lives in Klerksdorp in North West. They travelled by car to George in the Western Cape for a holiday. A map of South Africa is provided below.

### MAP OF SOUTH AFRICA SHOWING THE NATIONAL ROADS

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



2.1 In which general direction is George from Klerksdorp? (2)


2.2 Identify the national road that passes through only ONE province. (2)

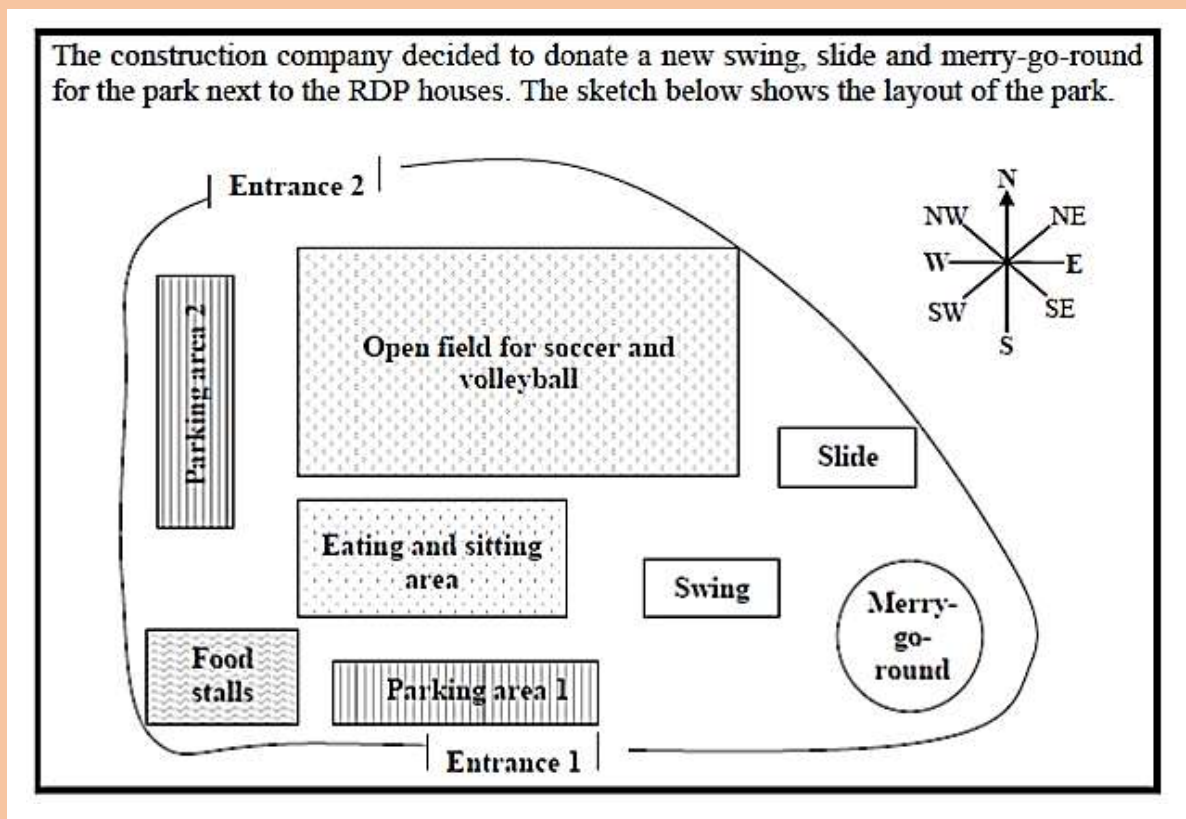

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.3 Describe TWO possible routes, without turning back to Kimberley, that the family could follow to travel from Bloemfontein to George. Name the national roads and any relevant towns in the description of the two routes. (8)


[8]

**QUESTION 3:**



Use the layout above to answer the questions that follows:

3.1 Which entrance is north of Parking area 1? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

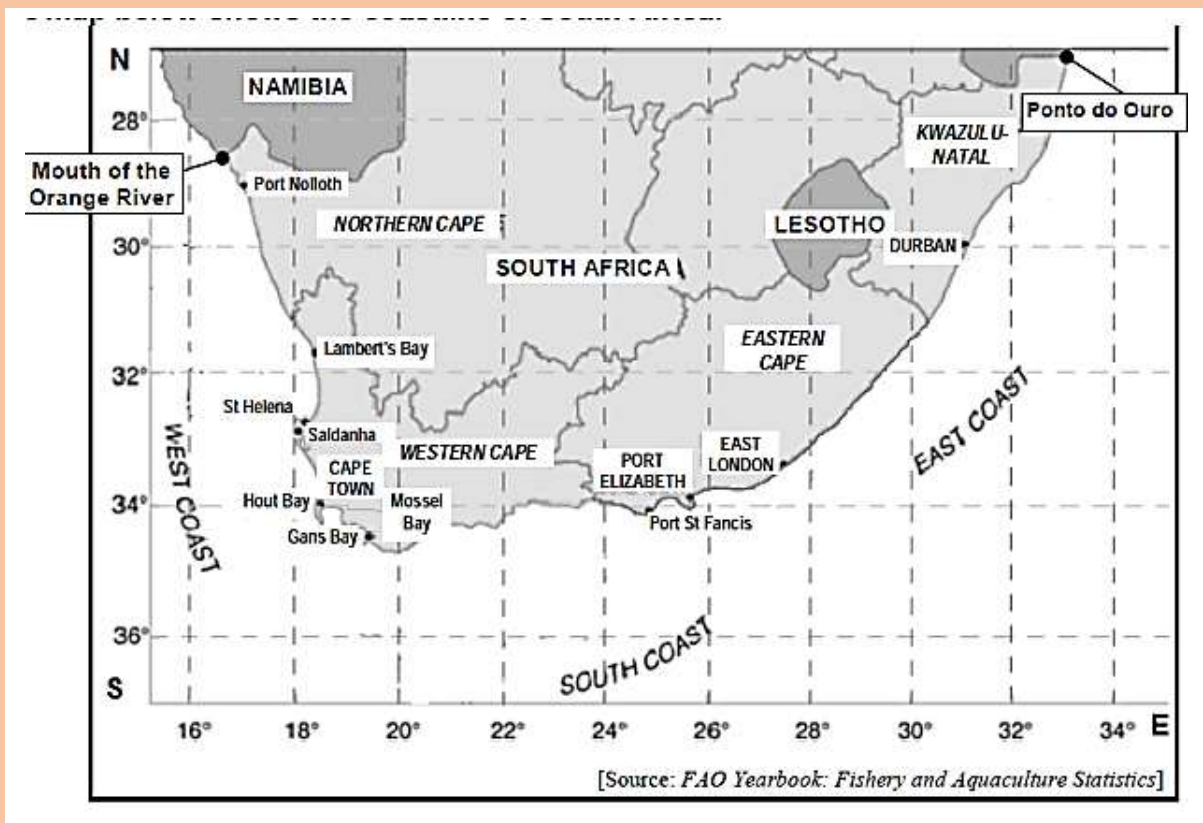
3.2 What playground equipment is situated in the south-eastern corner of the park?  
(2)


3.3 A teacher drew a scale drawing of the park using the scale 1 : 250. If the actual length of Parking area 2 is 15 m, determine the length (in cm) of Parking area 2 on the teacher's scale drawing. (2)


**QUESTION 4:**

The South African Coastline measures approximately 2798 Km from the mouth of the Orange River on the West coast to Ponta do Ouro in Mozambique on the East coast. The Eastern Cape has approximately 800km of coastline.

**The map below shows the coastline of South Africa.**



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4.1 Determine the total length, in miles, of the South African coastline if the coastline of the Eastern Cape is approximately 500 miles long. (3)


4.2 Use the map to list the coastal provinces of South Africa in descending order according to the length of their coastlines. (3)


4.3 Annie measured the length of the coastline of South Africa on her map and found it to be 223 mm long.

Determine the scale of the map in the form **1** : ...

Round off the answer to the nearest hundred thousand. (4)


[10]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 5:**

Mrs Nkosi lives in the centre of Pretoria and works in Sandton. She travels to work by car, covering approximately 65 km each way. She works a five-day week and presently a colleague travels with her to work. Mrs Nkosi pays an average of R650,00 per week for petrol. The general maintenance of her car is 35 cents per kilometre. Her colleague pays her R330,00 per week as her contribution towards the travelling costs. Mrs Nkosi has to be at work by 08:15 daily. It takes her between 2

- 1. 1 hours and 2
- 2. 1 hours to travel to work, depending on the traffic.

5.1.1 Determine the latest time that Mrs Nkosi should leave home to ensure that she always arrives at work on time. (2)


5.1.2 Calculate Mrs Nkosi's total expenses to and from work for a 22-day working month. (6)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Mrs Nkosi decides to use the Gautrain to travel between Pretoria and Sandton. (The Gautrain is a rapid rail link between Pretoria and Johannesburg.) Passengers are able to make the trip between Pretoria station and Sandton station in 42 minutes, which includes three 1-minute stops at other stations along the way? The train route and the train fares are given on the diagram below



5.2 Calculate the distance, in kilometres, travelled by the Gautrain between Pretoria station and Sandton station if it travels at an average speed of 85,8 km/h. (4)

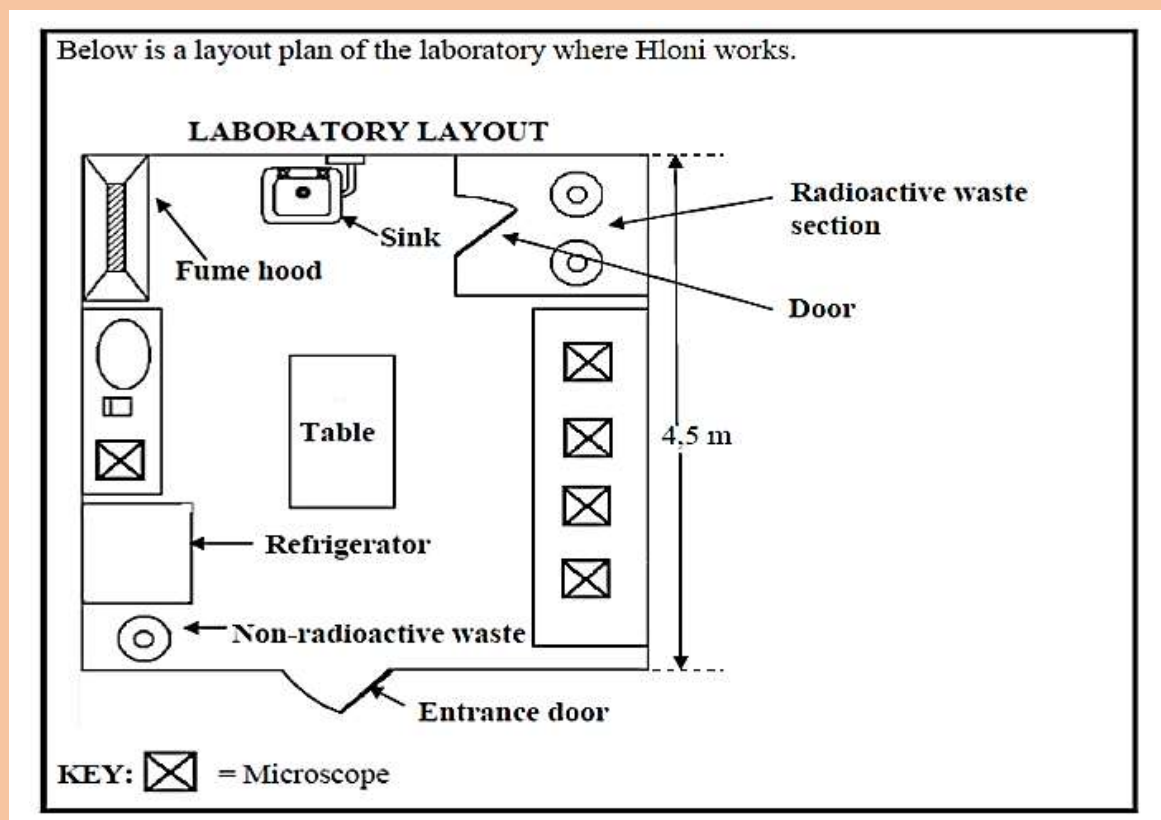
$$\text{Average speed} = \frac{\text{distance}}{\text{time}}$$


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Question 6

Hloni works in a laboratory where bacteria cultures are grown. [Bacteria culture is a scientific term used for growing bacteria under controlled conditions in a laboratory]. Bacteria cultures are used to test the effectiveness of certain medicines



Use the table below to answer the following questions:

6.1 Which item is located at the far left-hand corner of the laboratory as a person enters the laboratory? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

6.2 Hloni is in the radioactive waste section and sends a visually impaired person to fetch something from the refrigerator in the laboratory. How would Hloni clearly direct the person to get to the refrigerator after going out of the door of the radioactive waste section? (3)


6.3 Calculate the width of the laboratory if the total floor area is 18,9 m<sup>2</sup>

Use the formula  $\text{width} = \frac{\text{total floor area}}{\text{length}}$  (3)


6.4 The scale used on the layout plan is 1 : 58. Calculate the actual length of the table on the layout plan if its scaled length is 2,26 cm. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Question 7

Zoliswa, a property developer, bought the vacant land enclosed by Swallow Crescent and Starling Crescent with a plan to build houses. She measured the vacant land and claimed that if she marked sites with an area of  $0,15 \text{ cm}^2$  each on the map, she can get 14 sites on which she can build houses. Verify, showing all calculations, whether her claim is valid. (4)


[4]

Question 8

Peter plans to take part in the 2013 Cape Argus Cycle Tour, which is a cycle race that is 110 kilometres long.

He did research and obtained the following useful information on the Internet about this cycle tour:

- Cyclists are grouped according to their cycling ability. The groups start the cycle tour at different times, with the fastest cyclists starting first.
- There are cut-off points en route. These are points that cyclists must pass by at a stipulated time, otherwise they are not allowed to continue the cycle tour.
- The maximum time allowed to complete the cycle tour is 7 hours.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Refer to the map below and answer the following questions

8.1 Write down the cut-off time at Boyes Drive. (2)


8.2 Identify TWO sponsors indicated on the map below for this cycle tour. (2)


8.3 According to the map, if a cyclist reaches Perdekloof, he/she still has to cycle 52,2 km to finish the cycle tour. How many kilometres has he/she already cycled?


8.4 If a cyclist has only 30 km left to complete the cycle tour, what was the last cut-off point that he/she has passed? (2)


8.5 Determine the distance between the Steenberg cut-off point and the Noordhoek cut-off point. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

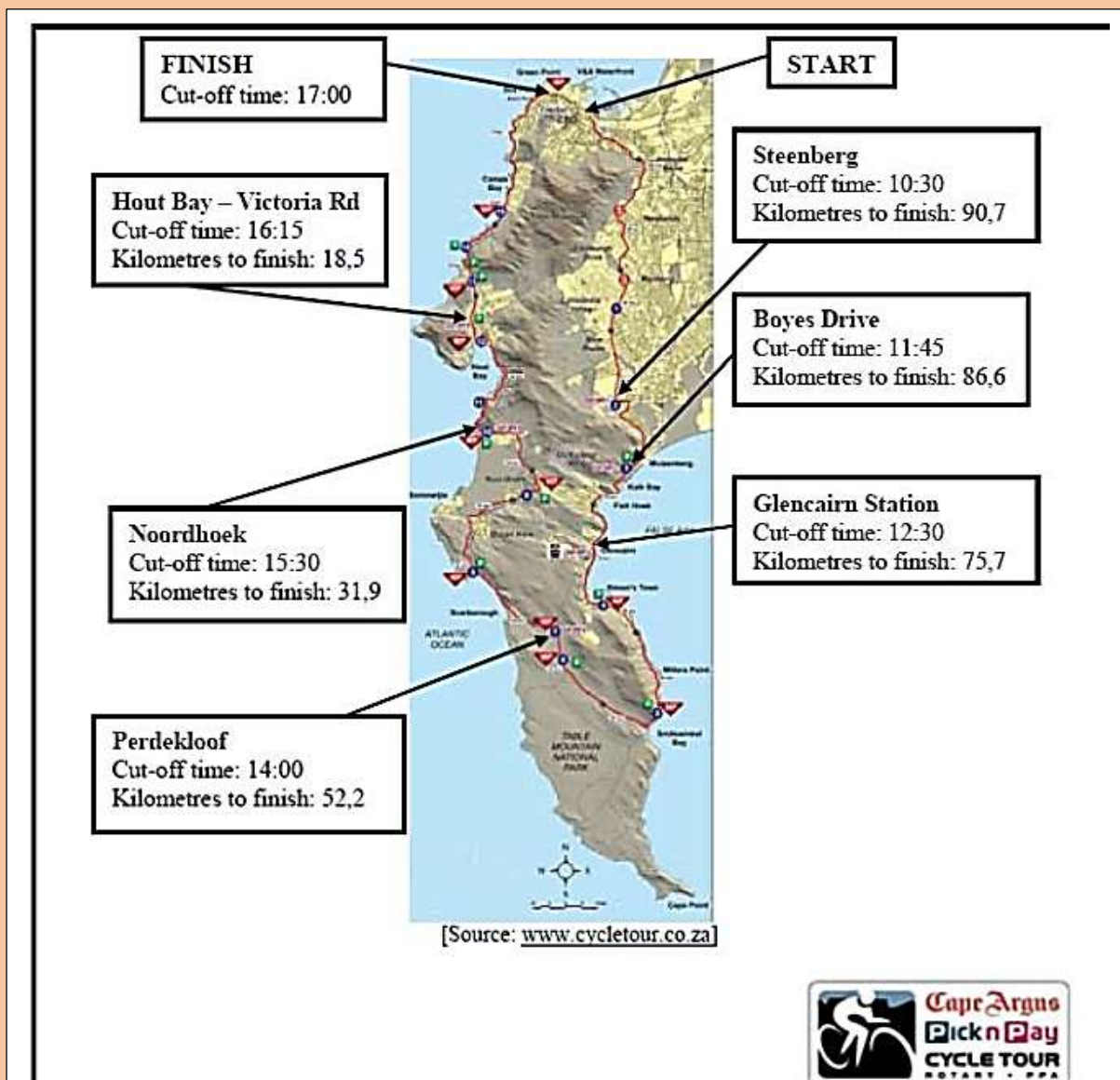
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

8.6 Determine the time (in hours) it will take a cyclist to finish the cycle tour if his/her average speed for the whole cycle tour was 15,9 km/h.

Use the formula:  $\text{time} = \frac{\text{distance covered}}{\text{average speed}}$  (2)


### MAP OF THE ROUTE OF THE CAPE ARGUS CYCLE TOUR

The map below shows the names of the six different cut-off points and the distance still left to cycle from that point to the end of the cycle tour.



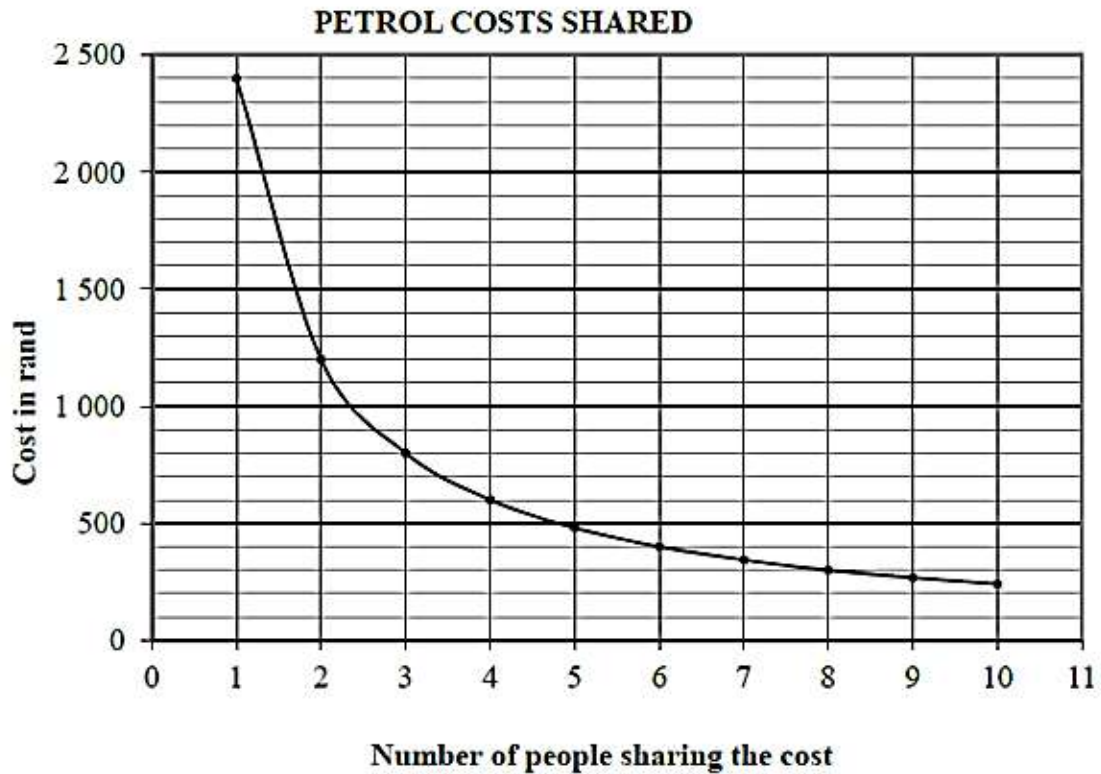
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Leslie travels to work in a minibus. His monthly petrol cost for this vehicle is R2 400 if he travels alone. He decides to let some of his colleagues travel with him so that they may share the petrol costs equally.



The graph below shows the relationship between the monthly petrol cost and the number of people sharing the cost.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

9.1 What type of proportion is represented by the graph above? (2)


9.2 Determine the monthly petrol cost per person if Leslie shares the petrol costs with SEVEN colleagues. (2)


9.3 Determine the number of people sharing the cost if the monthly cost per person is R800. (2)


9.4 Write down a formula that Leslie can use to calculate the monthly petrol costs per person sharing with him, in the form:

**Monthly petrol cost per person = ...** (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Question 10

Ms Nana decided to take the 13 learners who had never travelled out of Krugersdorp/Mogale City and two other learners for a weekend trip to Pretoria.

The ages of the learners were as follows:

16 17 18 17 19 18 17 17 18 20 17 17 18 18 19

To reduce costs, Ms Nana decided to drive the 16-seater minibus herself. The Arcadia Hotel has two types of rooms: family rooms and twin rooms. The teacher will not share a room.

TABLE 5 below shows the daily cost per room.

**TABLE 5: Accommodation costs**

Type of room	FAMILY ROOM*	TWIN ROOM**
Daily cost	R679 per room	R375 per person sharing***

**NOTE:**

\*A family room can accommodate 2 adults and 2 children under the age of 18.

\*\*A twin room can accommodate 2 adults.

\*\*\*An extra charge of R150 is levied if a person stays alone.

The parents of the learners agreed that the accommodation costs will be split equally amongst the learners and Ms Nana. The group intends staying at the hotel for two nights.

10.1.1 Write down an equation which can be used to calculate the cost of hiring  $m$  twin rooms. Only one person will be staying in each twin room. (2)




Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Ms Nana used a street map of Pretoria to travel around the city. The street map, together with the recent street name changes, is given below. Some of the roads are one-way roads (traffic travels in one direction only). Use the map to answer the following questions:

10.2.1 Write down the grid reference for the Steve Biko Hospital. (2)


10.2.2 In which general direction is Hospital Hill from the Union Buildings? (2)


10.2.3 Write down the name of a road on the map where the traffic travels in the opposite direction to the traffic in Steve Biko Street. (2)


10.2.4 Ms Nana drove the minibus from the Arcadia Hotel in Johannes Ramohoase Street to her friend's house in Tenth Avenue. Describe in detail the route she took to the house. (4)

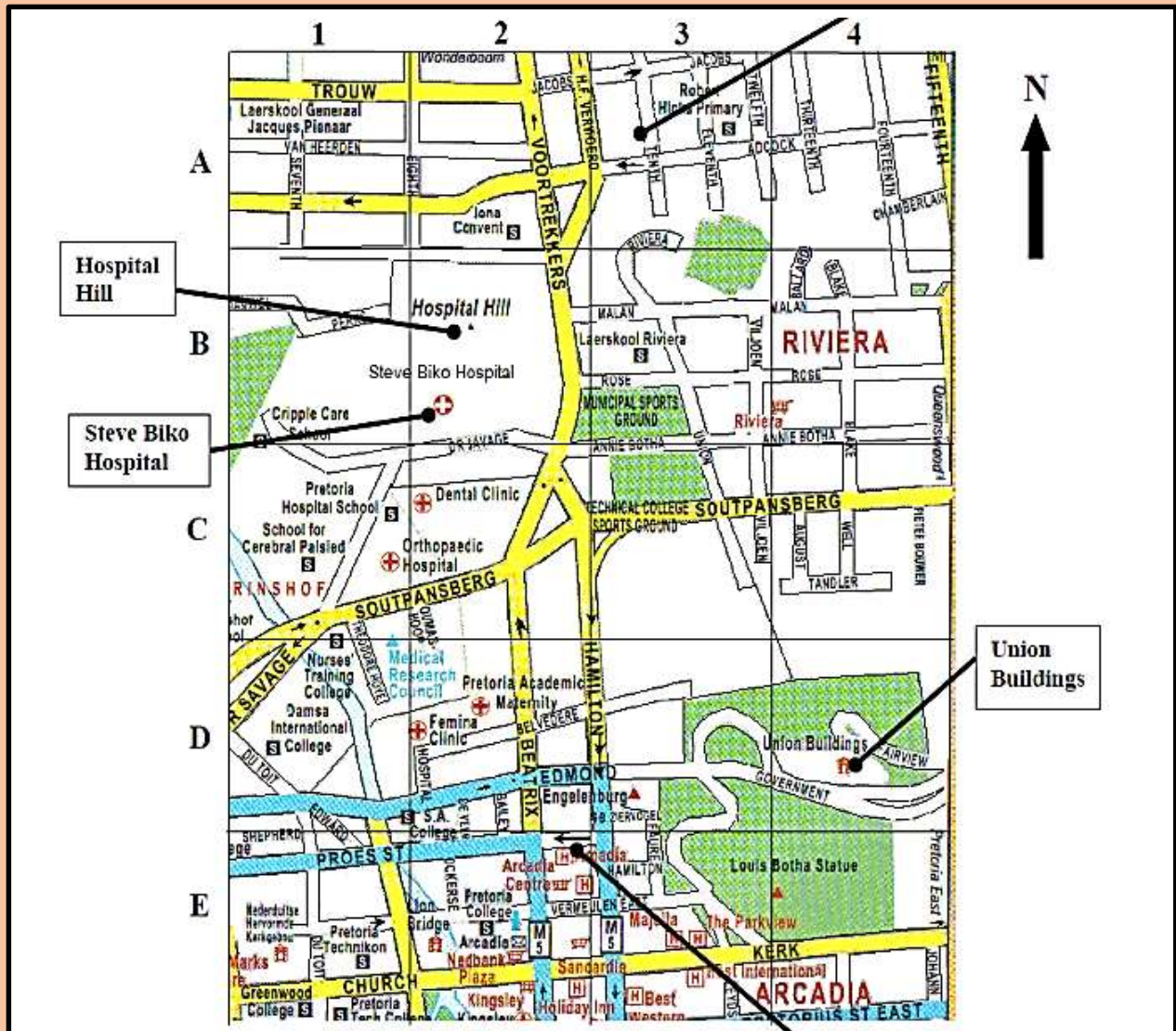
**[25]**


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**PRETORIA STREET MAP**

**Ms Nana's friend's house**



Hospital Hill

Steve Biko Hospital

Union Buildings

**KEY:** →  
Direction of the flow of traffic

Entrance of the Arcadia Hotel

**Pretoria street name changes:**

Church Street east of Nelson Mandela Drive	changes to	Stanza Bopape Street
Beatrix/Voortrekkers Street	changes to	Steve Biko Street
Vermeulen Street	changes to	Madiba Street
Proes Street	changes to	Johannes Ramohoaase Street

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Question 11

Mr Coetzee owns a small aeroplane. He uses it to transport visitors to different national parks in South Africa.

His small aeroplane has two fuel tanks because it has two engines.



**FUEL GAUGE OF A TWIN-ENGINE AEROPLANE**



The left side of the gauge shows the fuel reading of the left engine. The right side of the gauge shows the fuel reading of the right engine.

11.1 Determine the total number of gallons of fuel that are in the two fuel tanks if both of them are full. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

11.2 Estimate how many gallons of fuel are still in the LEFT TANK of the aeroplane. (2)


11.3 Estimate how many gallons of fuel will be needed to fill the RIGHT TANK of the aeroplane. (2)


11.4 Convert 18 gallons to litres where **1 gallon = 4,546 litres**. (2)


11.5 Determine the cost of 15,76 litres of fuel if fuel costs R9,92 per litre. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

11.6 The fuel price which was R9,92 per litre, decreased by 86 cents per litre. Calculate the percentage decrease. (3)


**[13]**

Question 12

The Nkosi family (two adults and three children) lives in Bontheuwel. They needed to travel by train to Cape Town for a weekend. A portion of the Cape Town Metro Rail train route map is given on **ANNEXURE A**.

Use the train route map (on **ANNEXURE A**) to answer the following questions.

12.1.1 In which general direction is Cape Town from Bontheuwel? (2)


12.1.2 List the shortest route that the train takes from Bontheuwel to Cape Town, naming ALL the stations the train passes. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

12.1.3 Thomas, Mr Nkosi's cousin, from Nyanga plans to visit the family during the Easter holidays. The day, on which he is planning to visit, there will only be evening trains to Phillipine and Lavistown. On which station will you advise him to go to and why? (3)


Mr Nkosi receives a call from an old friend, Mr Jansen who informs him that he is in Cape Town with family. Mr Jansen then invited Mr Nkosi and family to join him and spend the night at Mount Nelson Hotel. Mr Jansen paid all the hotel expenses.



☆☆☆☆

Mount Nelson Hotel is located at 76 Orange Street, Cape Town, 8001, South Africa

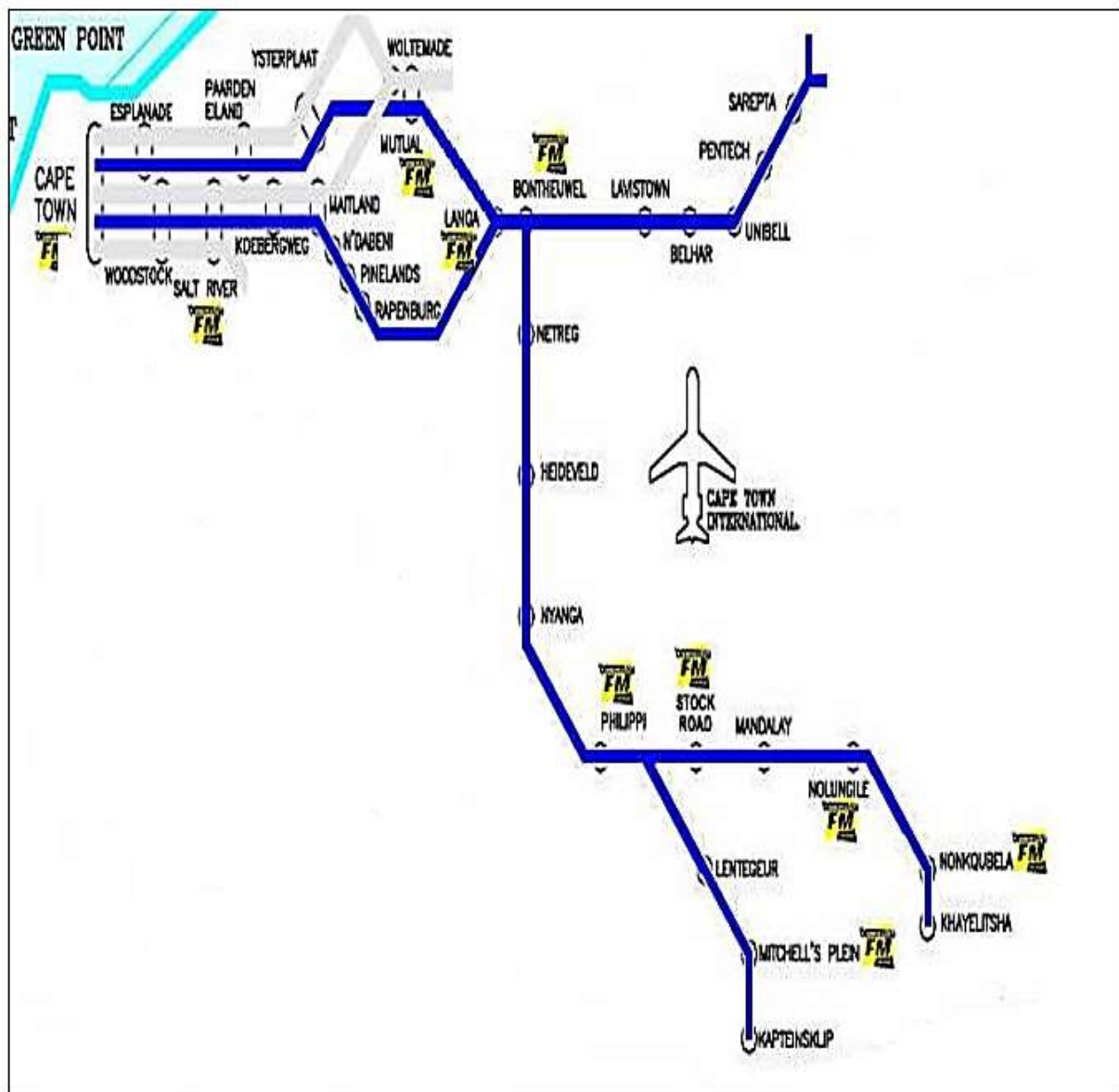
12.2 The distance from Cape Town railway station to Mount Nelson Hotel is 1,7km which can be travelled at an average speed of (5)20km/h due to the busy streets of Cape Town. Mr Nkosi uses the formula (Distance = Speed × Time) to calculate the time that can be taken to reach the hotel. He discovers it will take 0,085hours. Mr Jansen does not understand exactly when Mr Nkosi's family will be at the hotel. Express the time in terms of hours, minutes and seconds for Mr Jansen to understand. (5)


[13]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE A

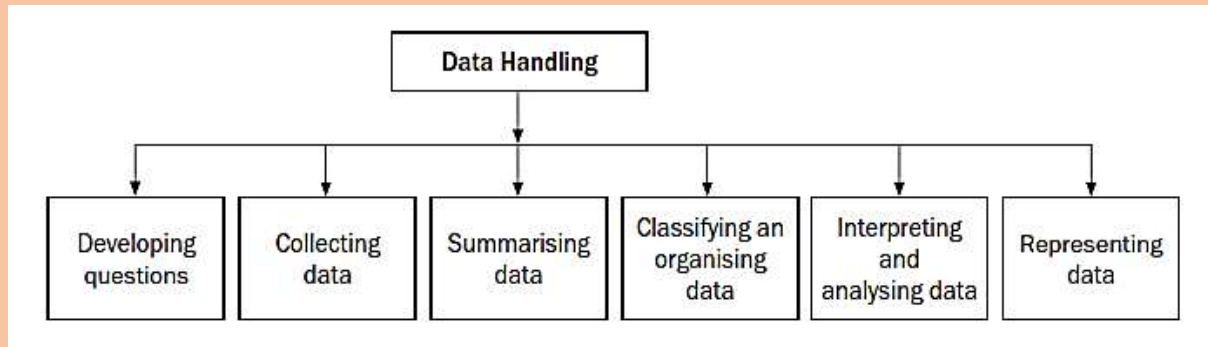


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## Data handling

Data handling involves the following processes:



### Classifying and organising data

#### Example

An Audi sales person has ordered cars from their plant in Germany. The table below shows the number of cars they received.

Colour	Red	White	Silver	Black
Model				
A3	2	5	4	3
A4	3	2	3	6
S3	4	3	5	5
Q7	1	4	4	3

Use the information provided above to construct a tally table for A3 cars.

#### Solution

Use vertical lines (tally marks) to represent the specific colour; the fifth tally mark should be drawn across the 4 tally marks.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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Colour	Frequency	Tally
Red	2	
White	5	
Silver	4	

### Example 2

This grouped frequency table shows the heights of seedlings (young plants) in different categories.

Height of seedling (mm)	Frequency
10–14	3
15–19	6
20–24	7
25–29	5
30–34	4

- How many plants were measured altogether?
- How many plants are less than 20 mm high?
- How many plants are more than 24 mm high?
- What percentage of seedlings are below 25 mm?
- How many plants are at least 25 mm high?

### Solutions

- $3 + 6 + 7 + 5 + 4 = 25$  plants were measured altogether.
- $3 + 6 = 9$  plants are less than 20 mm high.
- $5 + 4 = 9$  plants are more than 24 mm high.
- $16 \div 25 \times 100\% = 64\%$
- There are nine plants that fall into the intervals of 25 mm or longer.

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### Exercise

Working with frequency tables

The Geography examination marks, expressed as a percentage, of 52 learners were recorded as follows:

54 67 83 34 49 56 78 89 90 79 20 49 50 70 89 57 27 48 56 65 70 22 98 89 29 56

47 95 49 67 89 48 46 89 63 75 45 50 58 73 67 45 76 70 38 46 37 47 36 38 99 100

In the exam you are required to show results in terms of seven performance levels rather than percentages. As a result, the subject internal moderator who is analysing the results needs to work out the number of learners per performance level. Complete the frequency table below to work out the number of learners per performance level.

[14]

FREQUENCY TABLE : LEARNER PERFORMANCE IN GEOGRAPHY			
PERFORMANCE LEVEL	PERCENTAGE RANGE	TALLY	FREQUENCY
1	0 to 29		
2	30 to 39		
3	40 to 49		
4	50 to 59		
5	60 to 69		
6	70 to 79		
7	80 to 100		

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Summarising data

### Measures of central tendency and measures of spread

A measure of central tendency is a single value that attempts to show a central position of a set of data. There are three types of measures of central tendency: mean, mode and median.

#### Mean

The mean is the most common measure of central tendency that is used, but it can be easily influenced by high or low numbers in the data set.

It is also known as the **average**. It is calculated by adding all the values together and dividing by the number of values in the data set.

#### Median

The median is the middle number in the data set. To determine the median, you have to write all the numbers in the data set from the smallest to the highest and the number in the middle will be your median. If there is more than one number in the middle (i.e. if the data contains an even number of data values) add the two numbers in the middle and divide the answer by 2.

#### Mode

The mode is the data value that appears most often in a set of data. No calculation is needed to find the mode. You just find the value that appears most frequently. If no number appears more than the other numbers, then there is no mode.

exams

The principal of Hills Primary School compiled data of the number of learners who receive social

grants in each class.

He arranged these numbers in ascending order, as follows:

0 0 1 1 1 2 2 2 3 3 3 3 4 4 5 5 6 6 6 7 7

a) How many different classes are there at Hills Primary School?

b) Determine:

(i) the mode

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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(ii) the median

(iii) the mean

### Solutions

a) 21 (Count how many numbers are in the data set)

b) (i) Mode = 3 (the number that appears most in the data set)

(ii) Median = 3 (the middle number in the data set)

(iii) Mean = 
$$\frac{0+0+1+1+1+1+1+2+2+2+3+3+3+3+4+4+5+5+6+6+6+7+7}{21}$$

(Add all the numbers in the data set and divide by the total number of the data set.)

$$= \frac{71}{21}$$

$$= 3,38$$

### Activity

Thembeke compared the monthly salaries of the employees at two call centres, one in Greytown and the other in Johannesburg.

The following are the monthly salaries, in rand, earned by call-centre agents:

Greytown

4 200   4 320   4 500   4 650   4 650   4 650   5 500   5 650   7 250

Johannesburg:

5 500   5 525   5 980   6 250   6 250   6 250   6 300   7 800   8 200   8 900

a) How many employees are working at the Johannesburg call centre?

b) Calculate the average (mean) salary earned at the Greytown agency.


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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c) Write down the median monthly salary earned at the Johannesburg agency.


d) What is the modal salary earned at Greytown?

--

e) Find the median monthly salary of the employees in both agencies.


### Exercise

#### Measures of central tendency

Thandeka has a shop with a scrapbooking department and a toy department. She kept a record of the ages of the customers who visited the two departments on a particular day. Scrapbooking is a hobby which involves cutting and pasting photos, pictures and other decorative items into a book. Ages of customers who visited the scrapbooking department

35	60	46	57	54
34	60	54	56	46
47	67	65	54	45

Ages of customers who visited the toy department

5	15	25	7	36	21	70
20	17	6	15	65	9	15



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1. a) Arrange the ages of the customers who visited the toy department in ascending order. (1)


b) Determine the mode of the ages of customers who visited the scrapbooking department. (1)


c) Calculate the mean age of the customers who visited the scrapbooking department. (3)


d) Determine the median age of customers who visited the toy department. (4)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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e) How many customers visited the toy department? (1)


f) Calculate the percentage of customers older than 50 years who visited the scrapbooking department. (1)


[11]

2. The table below shows the results of the games played by 16 teams who are playing against each other to win the league.

Absa Premiership								
Pos	Team	Pld	W	D	L	GF	GA	Pts
1	Kaizer Chiefs	19	13	4	2	31	12	43
2	Mamelodi Sundowns	19	10	4	5	33	21	34
3	Bidvest Wits	18	10	4	4	23	13	34
4	SuperSport United	20	9	5	6	28	22	32
5	Orlando Pirates	17	9	3	5	21	13	30
6	AmaZulu	21	7	7	7	20	27	28
7	Platinum Stars	18	7	6	5	19	18	27
8	Bloem Celtic	19	6	8	5	25	24	26
9	Ajax Cape Town	20	7	5	8	20	22	26
10	Moroka Swallows	18	6	5	7	22	22	23
11	University of Pretoria	20	7	2	11	19	21	23
12	Black Aces	18	6	5	7	16	20	23
13	Maritzburg Utd	19	5	5	9	19	25	20
14	Polokwane City	19	5	4	10	21	26	19
15	Free State Stars	18	4	4	10	14	26	16
16	Golden Arrows	19	4	1	14	16	35	13

Key: Pld(games played) W(games won) D(games drawn) L(lost games) GF(goal for) GA(goals against) Pts(points)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2 a) How many teams do we have on the Absa Premiership league? (1)

b) How many points does the last team on the league have? (1)

c) How many games did the first team on the league play (PId)? (1)

d) Which team(s) played the least number of games? (1)

e) Calculate the mean for the number of games played. Give your answer to the nearest whole number. (4)


f) Determine the median of the “goal against” data set (GA). (3)


g) Write down the mode for the points scored (Pts). (1)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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## Range

The range is the difference between the largest (highest) and the smallest (lowest) values.

The range is a measure of spread because it tells you how spread out the data values are. A small range suggests that the values are grouped closer to the median, while a bigger range suggests that the values are more spread out.

**Range = highest data value – lowest data value** Measures of spread

## Example

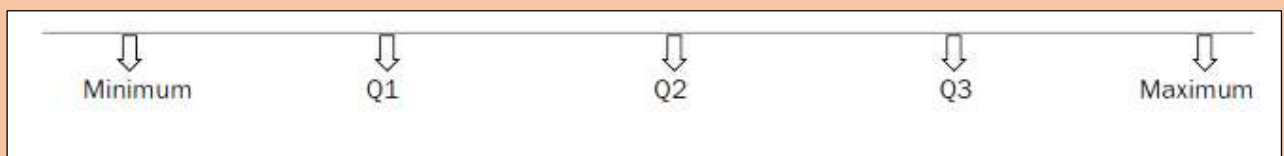
In the data: 2, 75, 79, 83, 86, 86, 89, 99, the range will be:  $99 - 2 = 97$ , which might give the wrong interpretation that the data is spread apart. To overcome outlier values, quartiles may be used to analyse the data.

**(An outlier is an extremely low or extremely high value.)**

## Quartiles

This is the division of data into 4 equal parts.

- ✓ The data is divided into four portions of 25% each.
- ✓ To determine the quartiles, first divide the information into 2 equal parts to determine the median ( $Q_2$ ), then divide the lower half into 2 equal parts, so that the median of the first half is the lower quartile ( $Q_1$ ).
- ✓ Then divide the upper half into 2 equal parts, so that the median of the second half is the upper quartile ( $Q_3$ )



Data can be summarised using 5 values, called the five number summary, i.e. the minimum value, lower quartile, median, upper quartile, and maximum value.

## *Interquartile range*

This is the difference between the upper quartile and the lower quartile.

It indicates the spread between the lower part of the data and the upper part of the data.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### Exercise

#### Measures of spread

The South African Weather Service recorded the temperatures for ten towns and cities in South Africa on 2009-05-13

**TABLE 5: Temperatures recorded on 2009-05-13 for ten South African towns and cities**

Temperature in °C	Bloemfontein (Bfn)	Cape Town (Ctn)	Durban (Dbn)	Johannesburg (Jhb)	Kimberley (Kmb)	Mafikeng (Mfk)	Musina (Msn)	Nelspruit (Nls)	Pretoria (Pla)	Potchkwane (Pot)
Minimum	5	13	15	6	10	8	20	9	7	3
Maximum	23	22	A	21	24	23	40	22	22	22

Mean (average) maximum temperature = 25,6°C

Use the information in the above table to answer the following questions.

1. The upper quartile for the minimum temperature is 13°C. Identify the towns or cities in which the minimum temperatures were less than the upper quartile. (7)


2. Calculate:

- 2.1 The maximum temperature, A for Durban. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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2.2 The median of the maximum temperatures. (3)


2.3 The percentage of the towns and cities that had a maximum temperature greater than the median. (1)


3. Would the maximum temperatures best be represented by the median or the mean? Justify your answer. (3)


4. Determine the interquartile range for the maximum temperatures. (6)

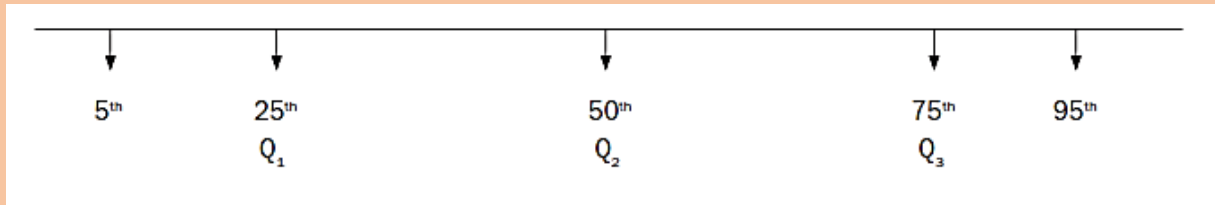

[22]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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## Percentiles

This is the division of data into 100 equal groups. This is used to analyse the spread of large sets of data. Percentiles can be represented as follows:



- ✓ 5% of values lie below the 5<sup>th</sup> percentile and 95% of the values lie above.
- ✓ 25% of values lie below the 25<sup>th</sup> percentile and 75% of the values lie above.
- ✓ 50% of values lie below the 50<sup>th</sup> percentile and 50% of the values lie above.
- ✓ 25% of values lie below the 25<sup>th</sup> percentile and 75% of the values lie above.
- ✓ 50% of the values lie below the 50<sup>th</sup> percentile and 50% of the values lie above.
- ✓ 95% of values lie below the 95<sup>th</sup> percentile and 5% of the values lie above.

### Percentiles are used to determine the percentage of the data grouped in category

The concept of percentiles is used in growth charts. The curves on the growth chart below represent the percentile values of the data collected from different age groups. The growth chart is used to compare the BMI (body mass index) of a child to others in his age group. This is also used to determine the health status of the baby.

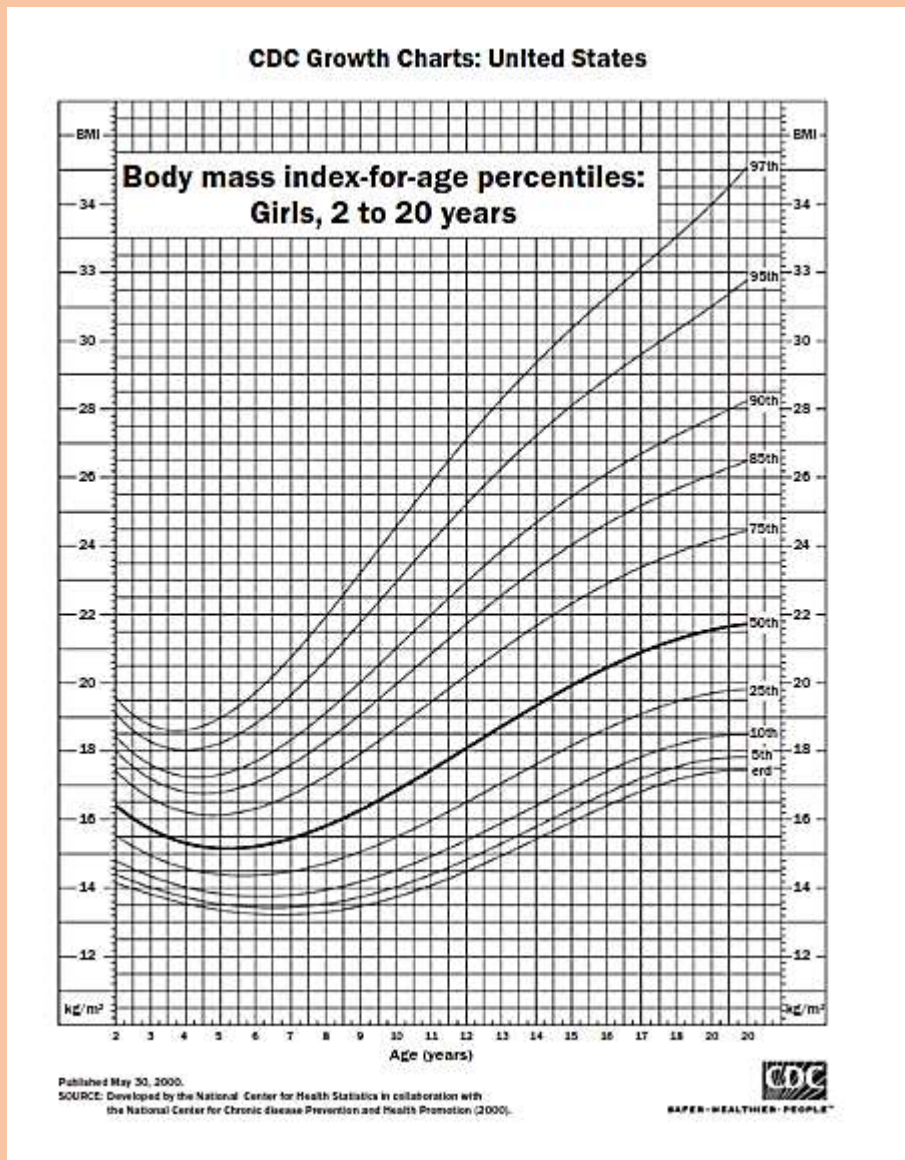
### Example

A South African couple has relocated to USA. The growth chart below has been used to monitor the growth of their female children.

**Use the chart to answer the questions.**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



a) What is the BMI of a 4 year old girl at the 95

**Solution**

Draw a vertical line upwards from 4 years to the 95 percentile?

Draw a horizontal line across to find the relevant BMI.

The BMI is 18 kg/m<sup>2</sup>.

b) The couple's 10 year old child has a BMI of 16 kg/m<sup>2</sup>. Between which percentile curves does her BMI lie?

**Solution**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Draw a vertical line upwards from 10 years. Draw a horizontal line across from 16 kg/m<sup>2</sup>.

Locate the percentile, where the two lines meet. Between the 25<sup>th</sup> and 50<sup>th</sup> percentiles.

c) The BMI of their youngest child who is 2 years old lies at the 45<sup>th</sup> percentile. What does this mean?

### Solution

The BMI of 45% of the girls of her age group is less than hers and the BMI of 55% of the girls in her age group is above hers.

d) Use the table below to determine the health status of their 16 year old girl with the BMI of 20 kg/m<sup>2</sup>

BMI for age percentile range	Weight status
<5 <sup>th</sup> percentile	Underweight
5 <sup>th</sup> percentile to < 85 <sup>th</sup> percentile	Healthy
85 <sup>th</sup> percentile to < 95 <sup>th</sup> percentile	Risk of overweight
≥ 95 <sup>th</sup> percentile	Overweight

### Solution

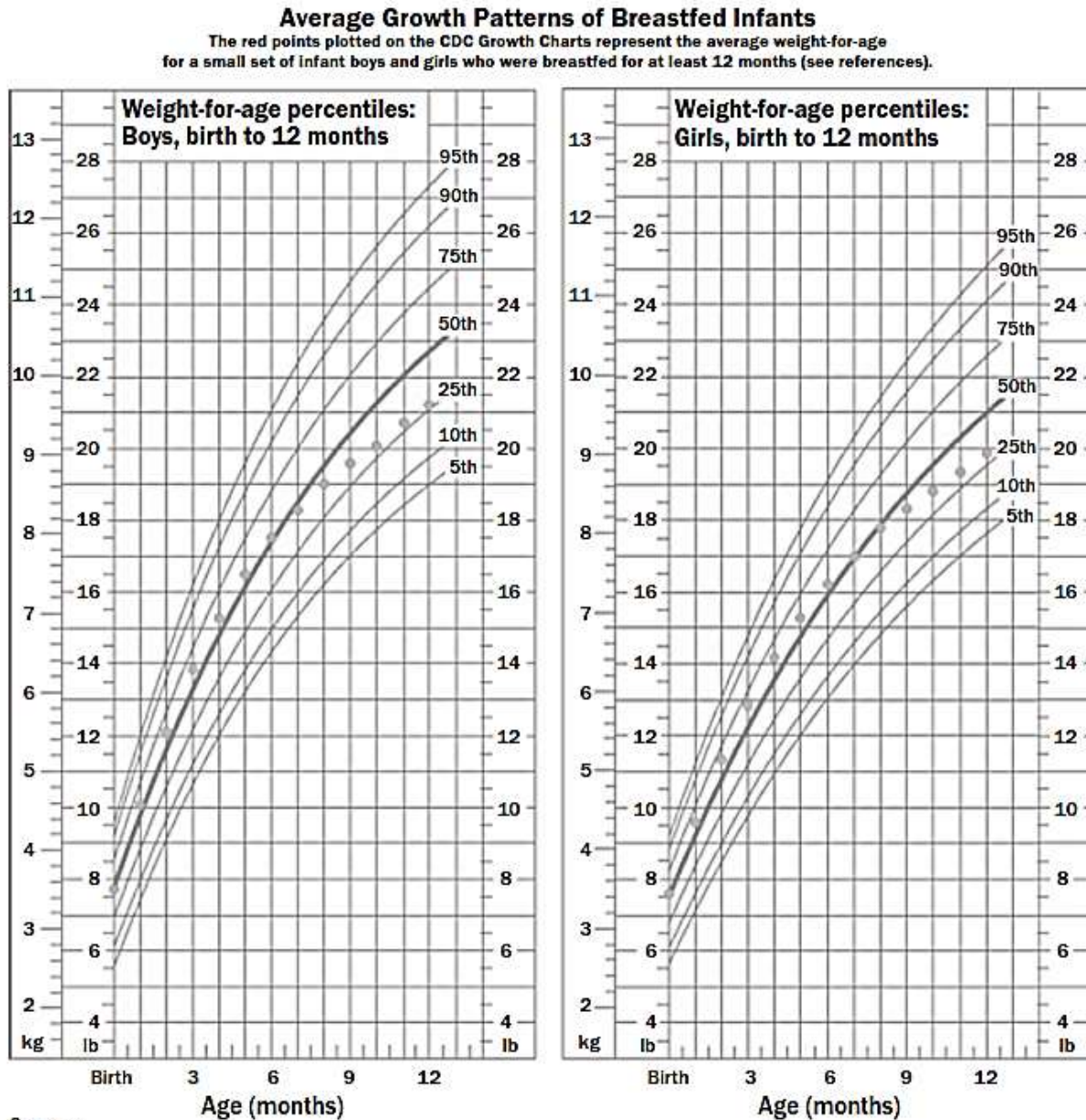
- Draw a vertical line upwards from 16 years.
- Draw the horizontal line across from 20 kg/m<sup>2</sup>.
- Determine the percentile and use it to determine the health status: it is just below the 50<sup>th</sup> percentile, therefore the child is healthy.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Exercise

Study the growth chart below and answer questions that follow.



Sources:

- Base chart – CDC Growth Charts: United States, Published May 30, 2000.

Graphic by kellymom.com, 2004

- Breastfed baby data points – WHO Working Group on Infant Growth. *The Evaluation of Infant Growth: a summary of analyses performed*

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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Mrs Michael, the visiting American ambassador has brought her twins, a boy and a girl who are 9 months old. She is also looking after her late sister's daughter who is 1 year old. Use the table below.

BMI for age percentile range	Weight status
<5 <sup>th</sup> percentile	Underweight
5 <sup>th</sup> percentile to < 85 <sup>th</sup> percentile	Healthy
85 <sup>th</sup> percentile to < 95 <sup>th</sup> percentile	Risk of overweight
≥ 95 <sup>th</sup> percentile	Overweight

1. What is the weight of her daughter at the 75 percentile? (1)


2. Give a range of percentile curves for her son who weighs 10,5 kg. (1)


3. Calculate the BMI of her niece whose height is 60 cm and whose weight at the 25<sup>th</sup> percentile. Give your answer in kg/m<sup>2</sup>

Use the formula :  $BMI = \frac{mass}{height(m^2)}$  (3)


4. Do you think she must be worried about her niece's health status? Explain. (1)

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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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5. What does it mean if the weight of a child is at the 68<sup>th</sup> percentile?


[8]

## **Representing, interpreting and analysing data**

### **Purposes of graphs:**

- a way of exploring the relationships in data
- a way of displaying and reporting data
- making it easier to report patterns and relationships, shapes of distributions and trends.

### **Any graph used to report findings should show:**

- the significant features and findings of the investigation in a fair and easy-to-read way
- the underlying structure of an investigation in terms of the relationships between and within the variables
- the dependent variable on the horizontal ( $x$ ) axis and the independent variable on the vertical ( $y$ ) axis.

### **Types of graphs**

We have the following types of graphs:

- Line graph
- Bar graph
- Histogram
- Scatter plot
- Pie chart
- Box and whisker plot.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Line graphs

In data handling we use line graphs to show the relationship between two quantities. A line graph is formed by using straight lines to join data points which have been mapped on a grid. It is used to show the change of information over time.

### Example

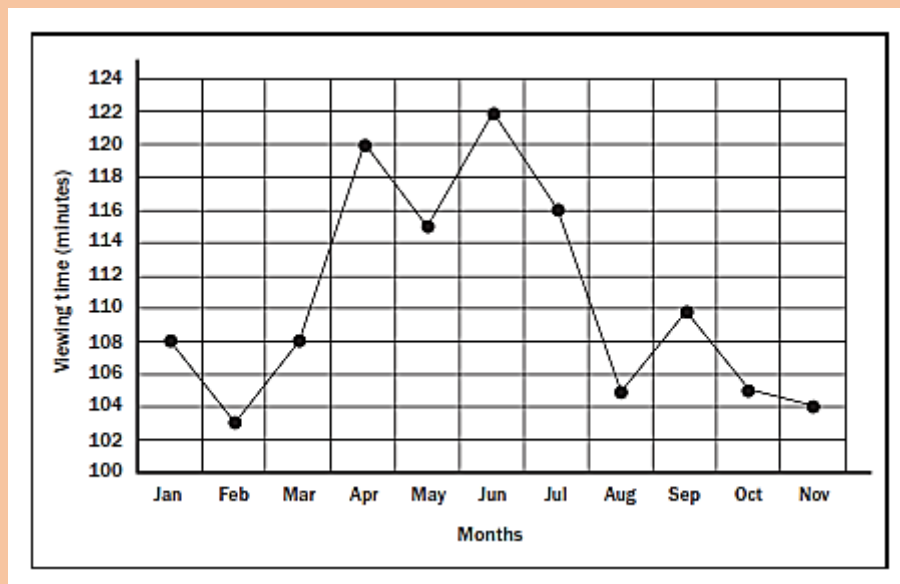
The table below shows the average number of minutes per month that Jabu spent watching TV from January to November last year.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Daily TV viewing time (min)	108	103	108	120	115	122	116	105	110	105	104

- Plot this data on a set of axes.
- Can you observe any trends or patterns in the data? Give some possible reasons for these trends.
- Would you be able to represent this data on a bar graph?
- What is the advantage of using a line graph to show this information?

### Solution

The points are plotted and connected with line segments.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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b) You can see that Jabu's viewing time increases in April, again in June and slightly in September (perhaps due to school holidays). We also see decreases in his viewing time during February, May, August, October and November. These could be times when he was preparing for tests and exams.

c) Yes, it would be possible to represent this data on a bar graph; the number of minutes would be plotted as a bar for each month.

d) A line graph helps us to see trends because we can easily see the increasing or decreasing slope of each line segment in the graph.

### Bar graphs

A bar graph is used to represent data that is sorted into categories. Display data is compared in categories. Each bar shows the number of items in that category and there are spaces between the bars.

A bar graph can be a:

- single graph
- double or multiple graph
- compound or stacked graph

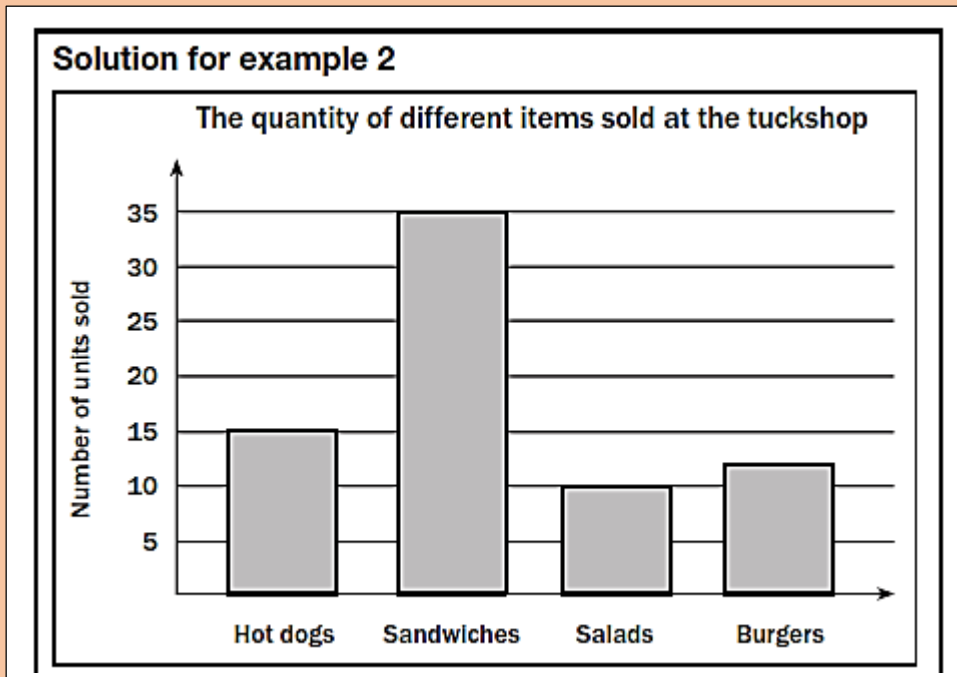
The school tuck shop keeps track of how many hot dogs, sandwiches, salads and burgers they sell at one break time. They have the data given in the table below.

Draw a bar graph to represent this data.

Item	Frequency
Hot dogs	15
Sandwiches	35
Salads	10
Burgers	12

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

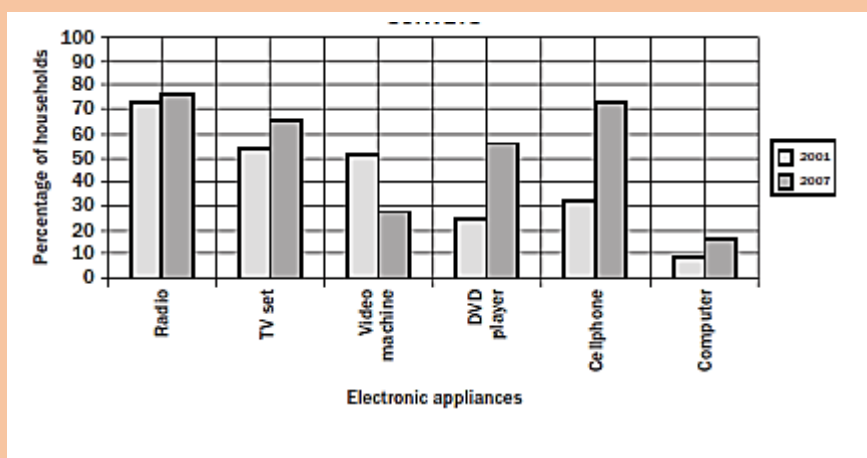


### Example 2

A survey of 1 000 households was undertaken during 2001 to determine how many households used various electronic appliances. A survey of the same number of households was repeated during 2007.

The graph below shows the results of the two surveys.

### RESULTS OF THE 2001 AND 2007 HOUSEHOLD SURVEYS



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

TABLE 2: Percentage of households using the various electronic appliances

Year	Radio	TV set	Video machine	DVD player	Cellphone	Computer
2001	73,0	53,8	51,2	24,4	32,3	8,8
2007	76,6	65,6	27,6	56,5	72,9	15,7

- What was the percentage increase in usage of TV sets between 2001 and 2007?
- Which appliance was used most in households during both 2001 and 2007?
- Which appliance showed a decreased usage in 2007 compared to 2001?
- How many of the 1 000 households surveyed used cellphones during 2007?
- Calculate the difference in percentage usage during 2001 between TV sets and DVD players.

**Solution**

a.  $65,6\% - 53,8\% = 11,8\%$

b. Radio

c. Video machine

d.  $72,9\% \times 1\ 000$  households

$= 0,729 \times 1\ 000$

$= 729$  households

e. Difference in percentage =  $53,8\% - 24,4\%$

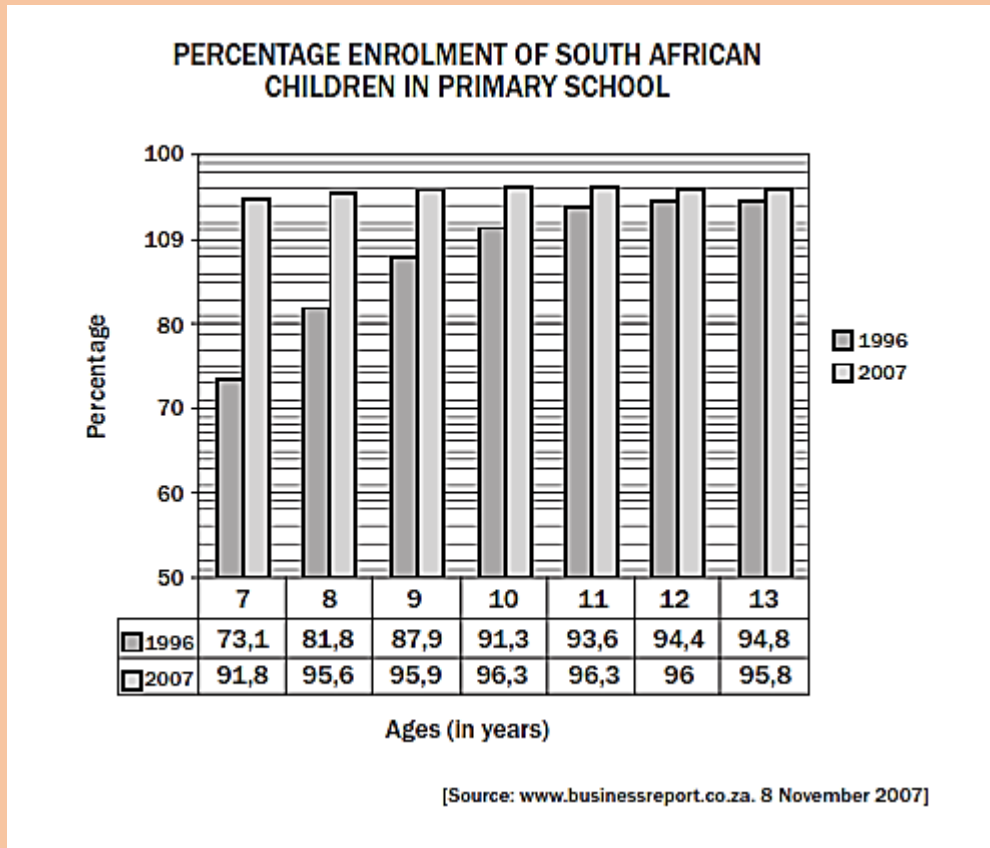
$= 29,4\%$

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### Exercise

The compound bar graph below shows the percentage of South African children for age seven to thirteen enrolled in primary schools during 1996 and 2007.



a. What percentage of 10 year olds was enrolled during 1996? (1)

--

b. Calculate the increase in the percentage enrolment of 11 year olds from 1996 to 2007. (1)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

c. Which age group had

1. the largest percentage enrolment in 1996? (1)


2. the smallest percentage enrolment in 2007? (1)


3. the greatest increase in percentage enrolment between 1996 and 2007? (1)


d. If there were 240 000 ten year old children in South Africa in 1996, calculate the number of 10 year olds enrolled in primary schools in 1996. (2)

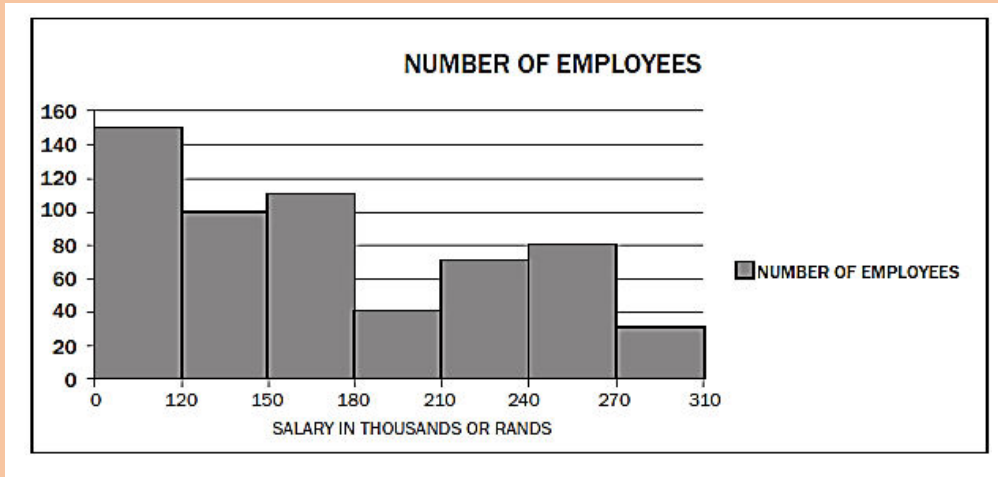

[7]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### Working with histograms

Mr Smith, an investor from Australia, has just opened the branch of Raetsiza Company in Pretoria central. The graph below represents the salary categories of the employees versus the number of employees per category. Study the graph and answer questions that follow.



1. How many people were employed by the Raetsiza Company? (2)


2. How many employees are earning the lowest salary? (1)


3. Why do fewer employees earn the highest salary?


(1)

4. Give possible reasons why there are fewer employees in the category of R180 000 to R210 000. (1)

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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

5. If the salary increases by 6%, what will be the new maximum amount for employees in the category R150 000 – R180 000? (2)


[7]

## Pie charts

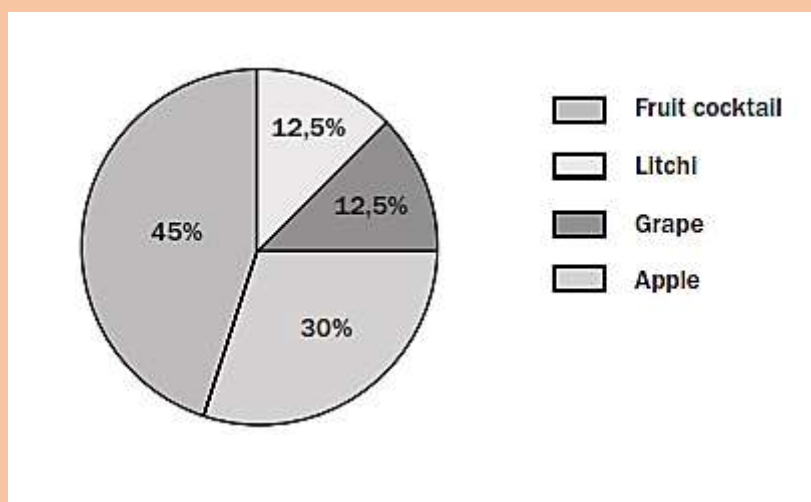
Pie charts are circular graphs, divided into sectors. They are used to show the parts that make up a whole.

They can be useful for comparing the size of relative parts. They do not give quantities of the categories, only the relative (compared) amounts. They do not show the actual amounts. The information is often presented as percentages that must add up to 100%. They are often used in media to show clear and important differences, but they cannot show shape and spread of data.

### Example

The pie chart below shows a survey of the different types of the favourite fruit juiceflavours that are normally bought by a group of 120 learners from Ndukwenhle High school during their lunch time.

### Fruit Juice Flavours



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- a) Calculate how many learners chose each type of juice.
- b) In what way does the pie chart work better than a bar graph to represent this data?
- c) What information would a bar graph give you that this pie chart does not?

### Solutions

a) 45% of 120 learners  
= 54 learners who chose fruit cocktail.

30% of 120  
= 36 learners who chose apple.

12,5% of 120 learners  
= 15 learners who chose grape.

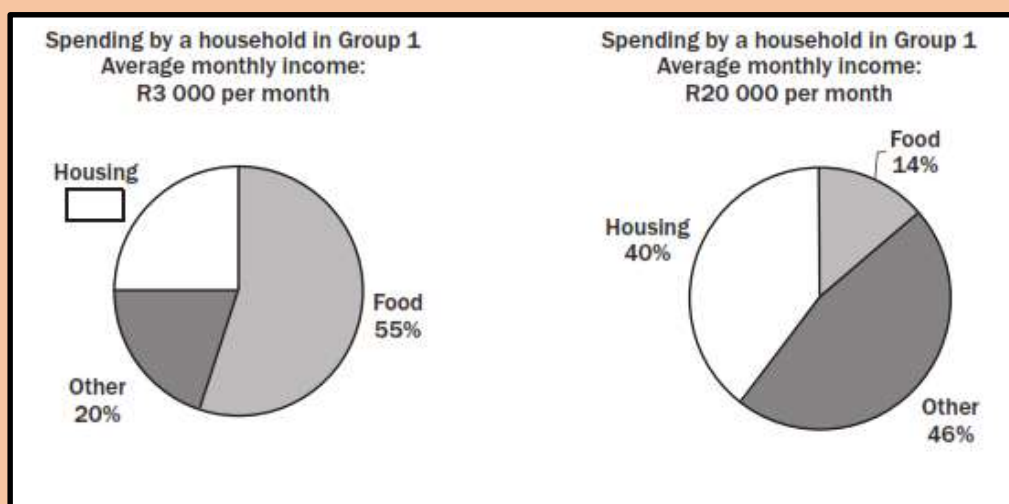
12,5% of 120  
= 15 learners who chose litchi.

b) The pie chart is a simple, visual representation that works well for representing percentages. A pie chart allows us to see at a glance the relative proportions of the learners who prefer each flavour.

c) The number of learners who prefer each flavour.

### Activity

A recent survey looked at households in two income groups. The study determined what percentage of monthly income was spent on food, housing and other requirements. The pie charts below represent the findings of the study.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

a. What were the average monthly incomes of the groups considered? (2)


b. What percentage of Group 1's earnings was spent on housing? (1)


c. How much was spent on housing by a household in Group 2? (2)


d. Which group spent the larger amount of money on food? Justify your answer by calculations. (5)

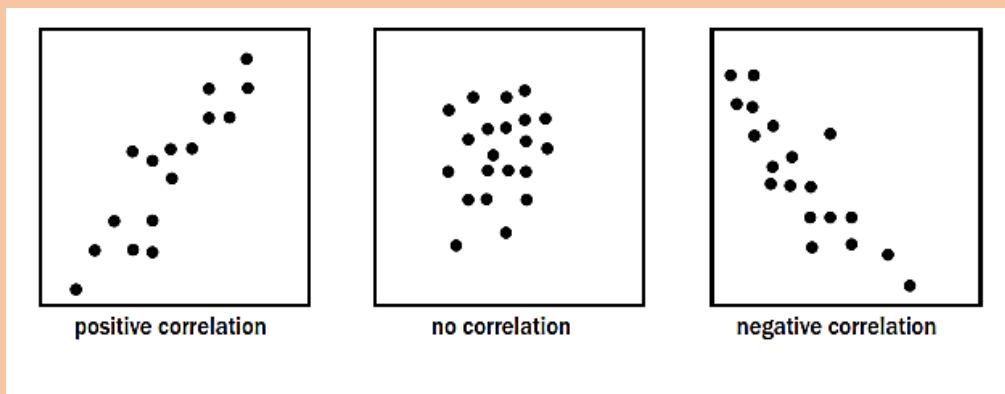

[10]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### A scatter plot can show:

- positive correlation
- negative correlation
- no correlation.
- When seeing patterns remember that the tighter together the points are clustered, the stronger the correlation between the variables you have plotted.
- If you find a pattern that slopes from the lower left to the upper right, this tells you that as  $x$  increases,  $y$  also increases. This means there is a “positive” correlation between the two variables.
- If you find a pattern that slopes from the upper left to the lower right, this tells you that as  $x$  increases,  $y$  decreases. This means there is a “negative” correlation between the two variables.



### Example

After writing controlled tests for term one, Tourism and Mathematical Literacy marks of 10 randomly selected Grade 10 learners were recorded.

TOURISM	55	60	20	70	5	40	50	10	30	55
MATHS LIT	70	60	40	75	80	30	70	5	45	50

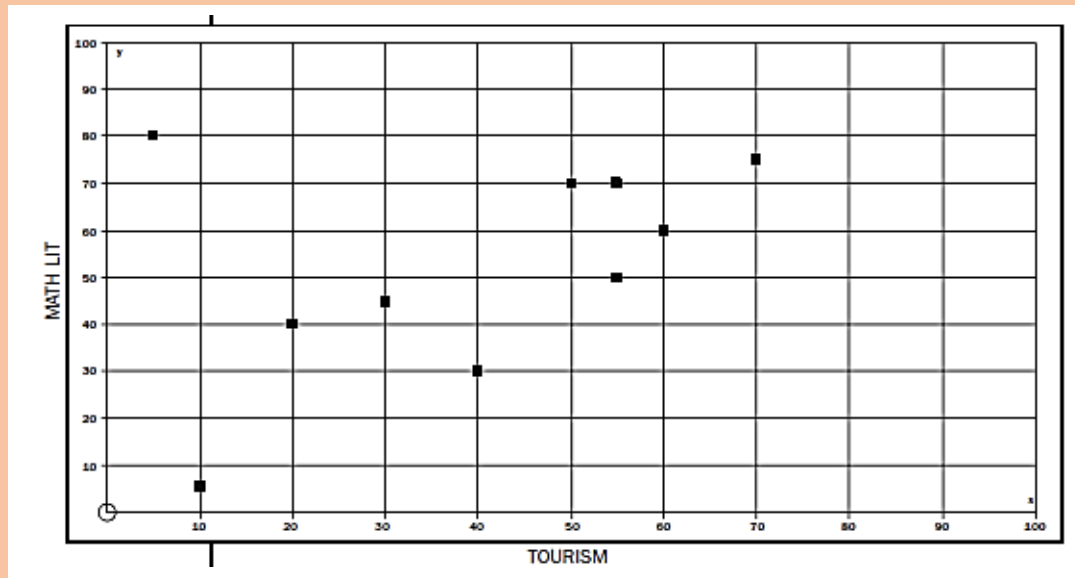
- Draw a scatter plot for the marks.
- Describe the relationship between the marks.
- Is there any point you regard as an outlier? Give a reason for your answer.
- Is there a correlation between the sets of data?

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Solutions

### SCATTER PLOT



b) There is a positive relationship between the Tourism and Mathematical Literacy marks.

c) Yes, point (5; 80). The learner has got the highest mark in Mathematical Literacy and the lowest mark in Tourism. Perhaps there is a mistake with one of the marks.

d) Yes and it is a positive correlation.

### Box and whisker plots

Box and whisker plots are graphical representation of the five number summary of a set of data.

The five number summary:

Minimum value Lower quartile ( $Q_1$ )

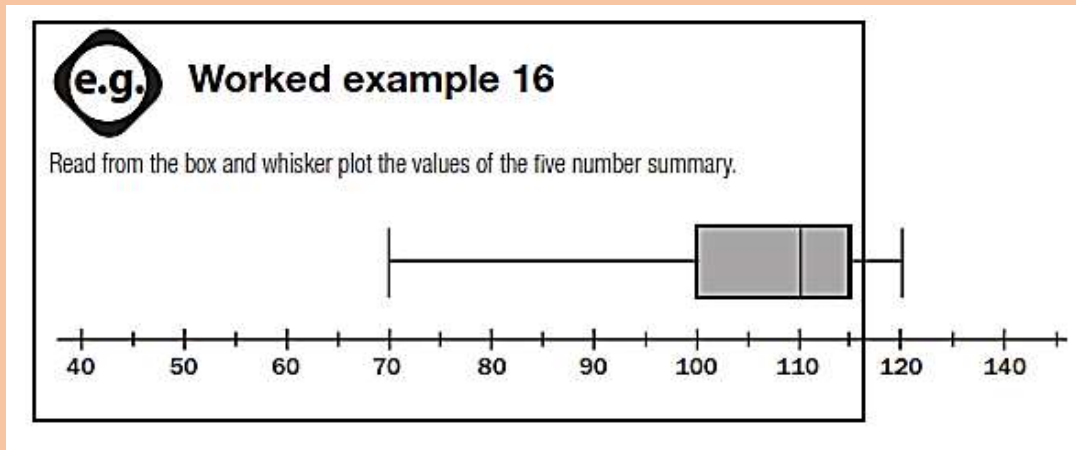
Median ( $Q_2$ )

Third quartile ( $Q_3$ )

Maximum value

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

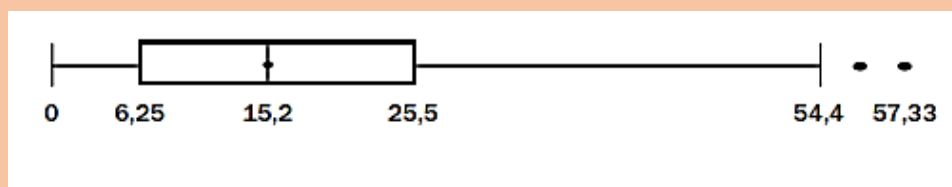


**Solution**

Minimum	70
Lower quartile ( $Q_1$ )	100
Median ( $Q_2$ )	110
Third quartile ( $Q_3$ )	115
Maximum value	120

### Exercise

The box and whisker plot below represents the batting averages of 160 cricketers who have batted in T20 matches since 1 January 2009. Answer the questions that are based on the plot.



1. What is the name given to the two data points with values 57 and 57,33? (1)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2. How many players have a batting average less than 6,25? (2)


3. What must a batsman's average be for him to be in the top quartile? (1)


d. Jacques Kallis is the South African with the highest batting average. If his average is 48,4, how does he compare with the other batsman? (1)


[5]

### Revision exercises : MEASURING WEIGHT AND QUARTILES

A Ruler must be used to find points of intersection on the graph. Conversions should be done when working with the BMI formula, weight should always be in kg and height should always be in meters. Some questions will require you to calculate the BMI first before the actual answer

**USE THE GROWTH CHARTS BELOW [ANNEXURE A AND ANNEXURE B] TO ANSWER QUESTION 1 AND 2**

#### QUESTION 1:

Mr Mnisi the head of curriculum at Gauteng North district went to OR Tambo international airport to welcome 5 exchange students from Australia. The 3 girls and 2 boys were accommodated at Protea hotel in Pretoria for the first 3 days. On the second day, they all had fever .Mr Mnisi took the students to Steve Biko hospital for

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

consultation. Before any medical examination, the nurse took the readings of their mass ,height ,blood pressure and temperature

1.1 Give the possible reason why they all had fever on the second day? (2)


1.2 Ian has the BMI-for-age value that positioned him on the 60<sup>th</sup> percentile, what does this mean? (2)


1.3 How old is Bruce, if his BMI of 25 kg/m<sup>2</sup> positions him on the 85<sup>th</sup> percentile? (2)


1.4 Joy is a 16 year old girl with a BMI-for-age value that positioned her on the 50<sup>th</sup> percentile, determine her BMI. (2)


1.5 The nurse said Celine one of the girls has the average BMI. What does this mean? (2)


[10]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 2:**

Mr Mokoane and Ms Dolo, the soccer and netball coaches at Pretoria West high school have taken the 2 girls and 2 boys who were selected to take part in the provincial competition to Mr Magana the local doctor ,to check their health status. Medical examinations were done and results were given .Use the table below to answer the questions that follows

BMI FOR AGE PERCENTILE RANGE	WEIGHT STATUS
< 5 <sup>th</sup> percentile	Underweight
5 <sup>th</sup> to < 85 <sup>th</sup> percentile	Healthy
85 <sup>th</sup> to < 95 <sup>th</sup>	Risk of overweight
≥95 <sup>th</sup> percentile	Overweight

The formula :  $BMI = \frac{\text{weight}}{\text{Height}^2}$  may be used.

2.1 Determine Lethabo’s health status who is 14 years old, and her BMI is 21kg/m<sup>2</sup> (3)


2.2 What advise do you think Mr Magana will give the educators about Thato, the 16 years old boy who has the BMI of 16kg/m<sup>2</sup>. Give 2 advises. . (6)


2.3.1 Mahlogonolo the 15 years old grade 8 girl, is 150cm tall and weighs 60kg. Determine her health status. (6)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

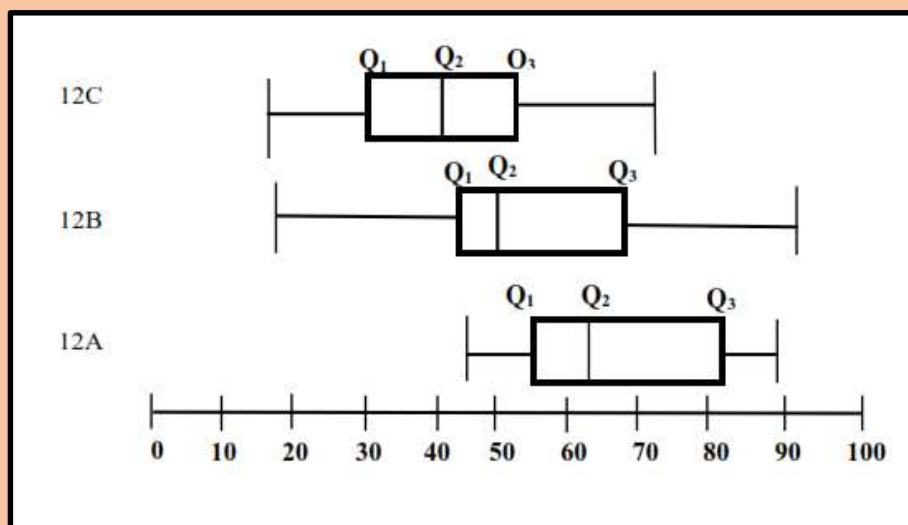
2.3.2 How much weight must she lose for her to be classified under the 'healthy' category? (7)


### QUESTION 3

Mr Sonn is a grade 12 Mathematical Literacy teacher at Commodore High School. He teaches 3 grade 12 classes:

- 12A: 17 learners,
- 12B: 16 learners and
- 12C: 15 learners

The June examination results of the 3 classes are represented by the box-and-whisker plots below:



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.1 Estimate the median for 12C. (2)


3.2 Which of the three classes had the best examination performance? Explain your choice. (4)


3.3 From which class is the top learner? (2)


3.4 Learners whose scores are below 40% have failed the examination. Which class had the highest number of failures? (2)


3.5 Comment on 12C's performance, using the spread of marks as shown in the box- and-whisker plot for this class. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.6 The curriculum advisor asked Mr Sonn to identify learners for the winter school program organised by the district. All learners who scored 50% or less in the examination must attend. Learners who scored between 50% and 80% will have winter school classes at the school with their teacher. All learners who scored 80% or more will receive revision packs to work on their own in the comfort of their homes.

3.6.1 From which class will the least number of learners go to the district winter school? (2)


3.6.2 How many learners will receive revision packs? (6)


3.6.3 Which class will have the largest number of learners remaining with Mr Sonn during the winter school holiday? (2)

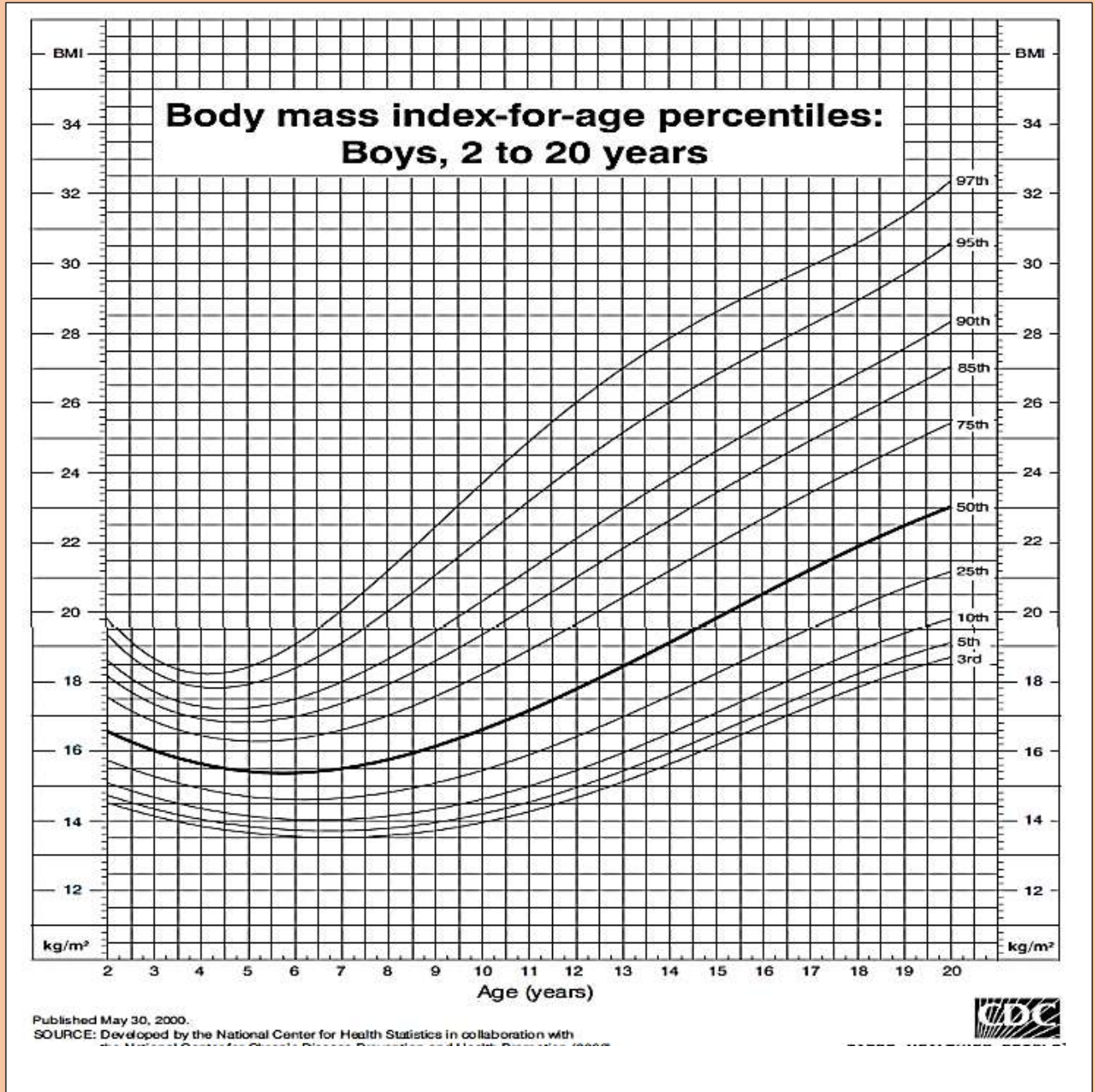

[22]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE A

### BMI-FOR-AGE GROWTH/HEALTH CHART

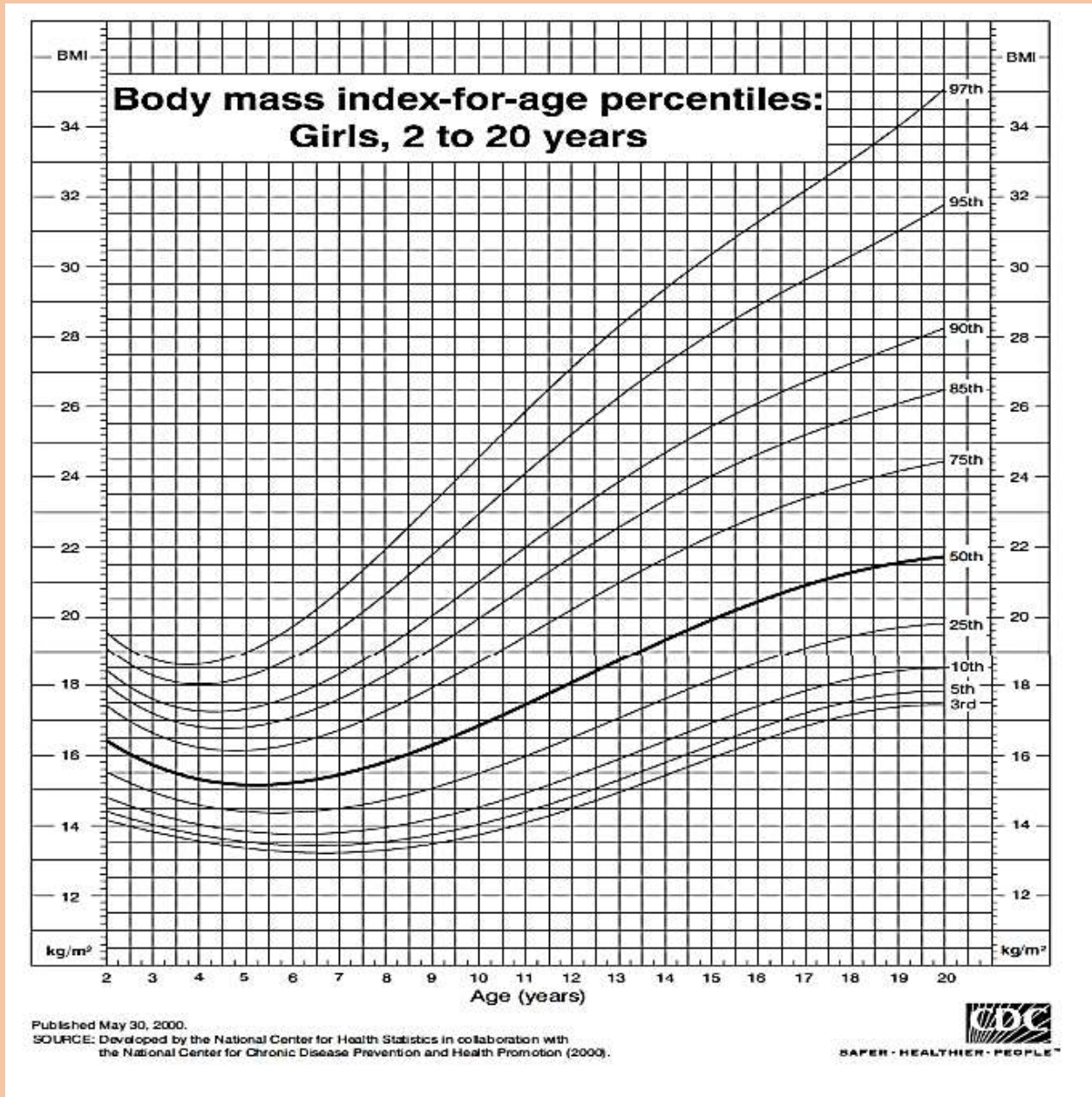


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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## ANNEXURE B

### BMI-FOR-AGE GROWTH/HEALTH CHART

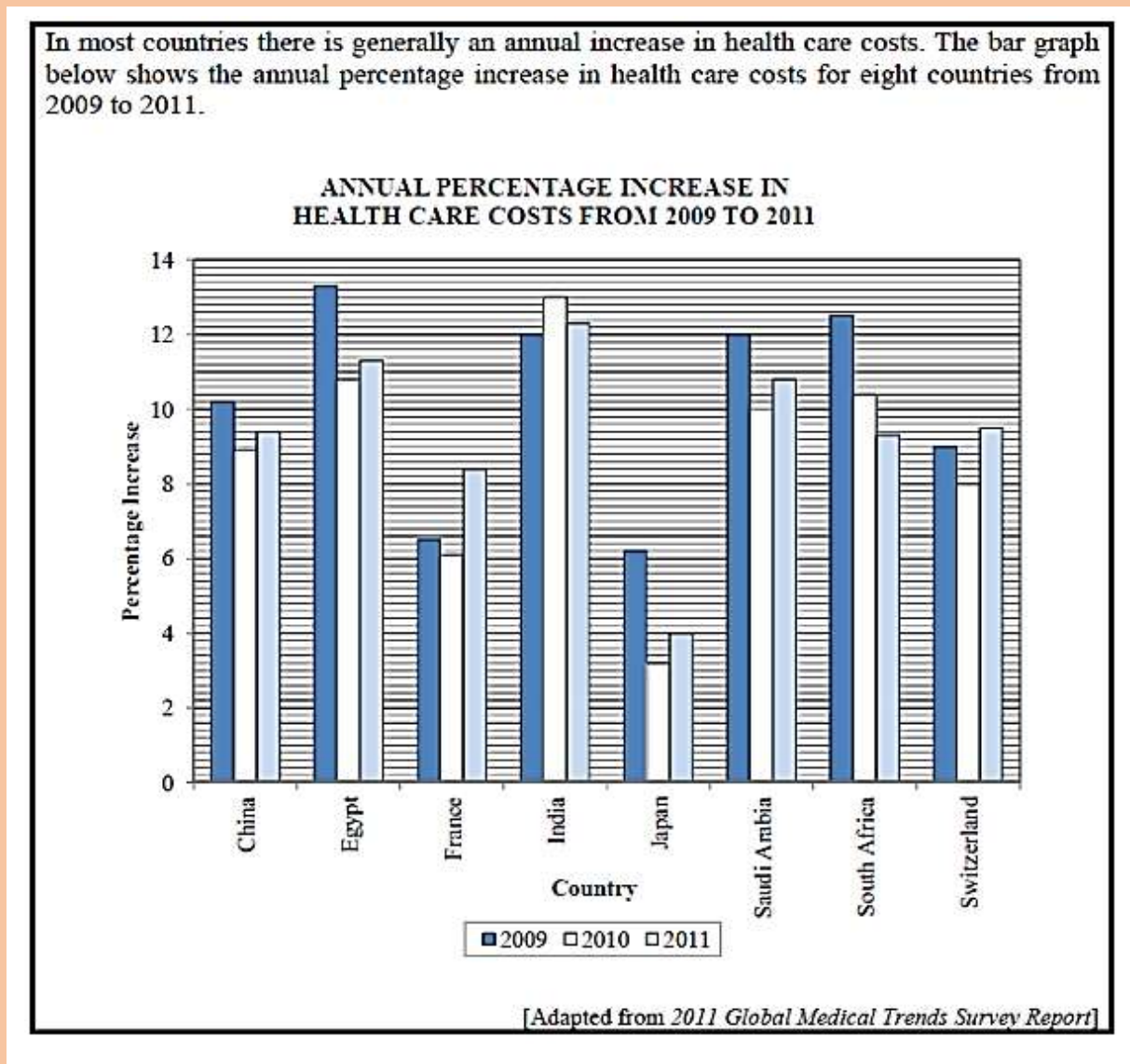


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Study the given graph or table thoroughly before answering the questions, understand the context, if the information given is in millions, remember to use millions when calculating. If the information given is in percentages, remember to use percentage when calculating.

QUESTION 1:



1.1 Give India's percentage increase in health care costs during 2010. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2 Which country's percentage increase in health care costs was 8% during 2010? (2)



1.3 Identify the country which had the highest percentage increase in health care costs during 2009. (2)


1.4 Which country showed a decrease in health care costs from 2009 to 2011? (2)


### QUESTION 2:

The results of Census 2011 were released by Statistics South Africa in November 2012.

TABLE 4 below summarises the highest level of education for all South Africans who were 20 years and older in the years 1996, 2001 and 2011.



**TABLE 4: Highest level of education of persons 20 years and older for 1996, 2001 and 2011**

EDUCATION LEVEL	1996		2001		2011	
	Number	%	Number	%	Number	%
No schooling	4 055 646	19,1	4 567 498	17,9	2 665 875	8,6
Some primary	3 522 956	16,6	4 083 742	16,0	3 790 134	12,3
Completed primary	1 571 774	7,4	1 623 467	6,4	1 413 895	4,6
Some secondary	7 130 121	33,6	7 846 125	30,8	10 481 577	33,9
Grade 12	3 458 434	16,3	5 200 602	20,4	8 919 608	28,9
Tertiary education	1 512 602	7,0	2 151 336	8,5	3 644 617	11,7

[Source: *Census 2011 Fact sheet*]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.1.1 The number of persons aged 20 years and older with no schooling increased from 1996 to 2001. Explain, with calculations, why the table shows a lower percentage of persons with no schooling in 2001 compared to 1996. (5)


2.1.2 In 2011, the number of persons who were 20 years and older was approximately 59,7% of the total South African population. Determine the total number of persons who were younger than 20 years in 2011. (4)


2.1.3 The total population in South Africa was 44 819 778 in 2001. If a person was randomly chosen in 2001, determine the probability that the person's highest level of education would only be Grade 12. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

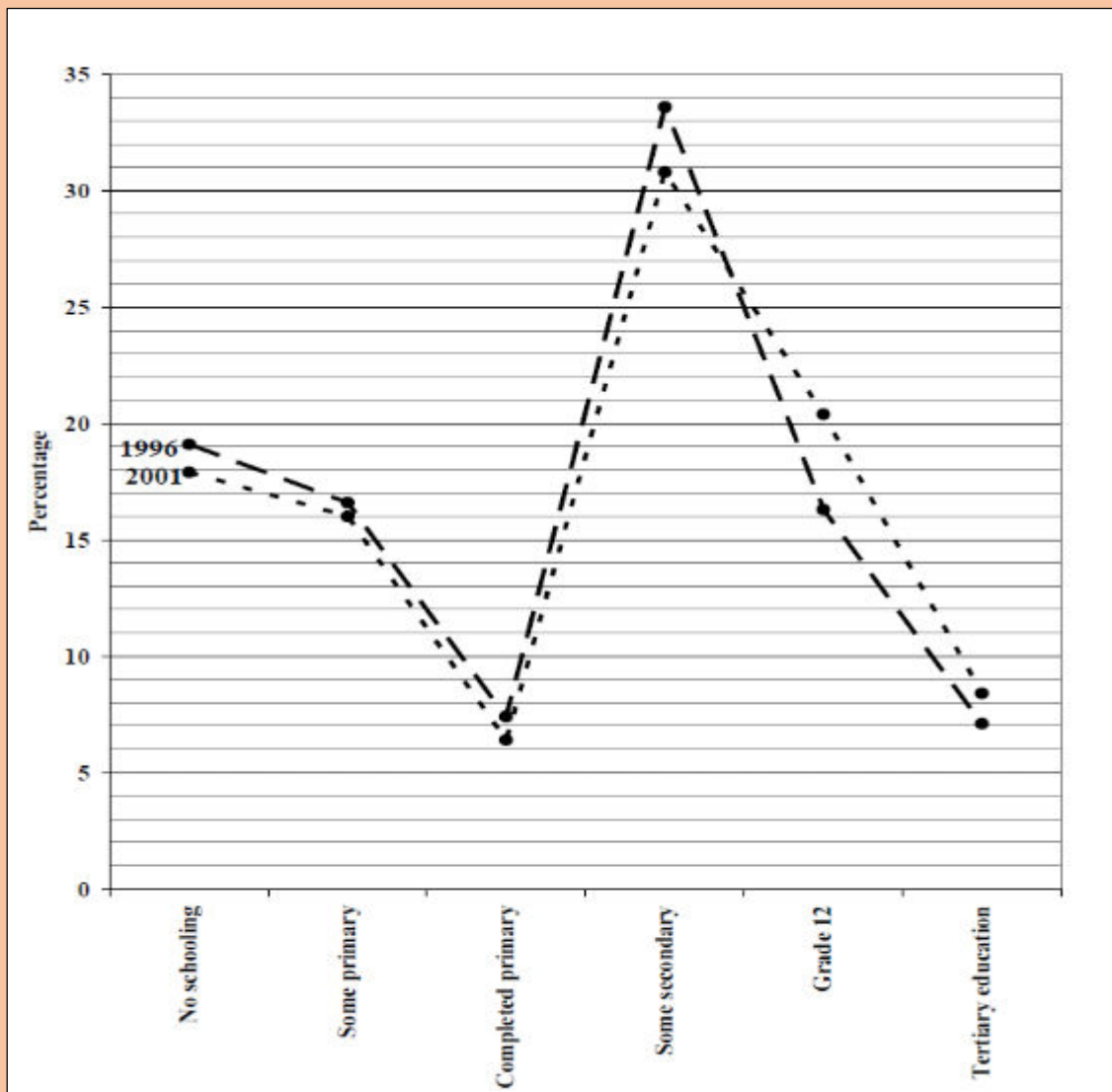
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Line graphs representing the highest level of education for persons 20 years and older for 1996 and 2001 have already been drawn on graph below.

2.2.1 Use the graph below and TABLE 4 to draw the line graph that represents the highest level of education for 2011. (6)

2.2.2 Describe TWO trends in the highest level of education by comparing Grade 12 and tertiary education from 1996 to 2011. (4)


### PERCENTAGE HIGHEST EDUCATION LEVEL



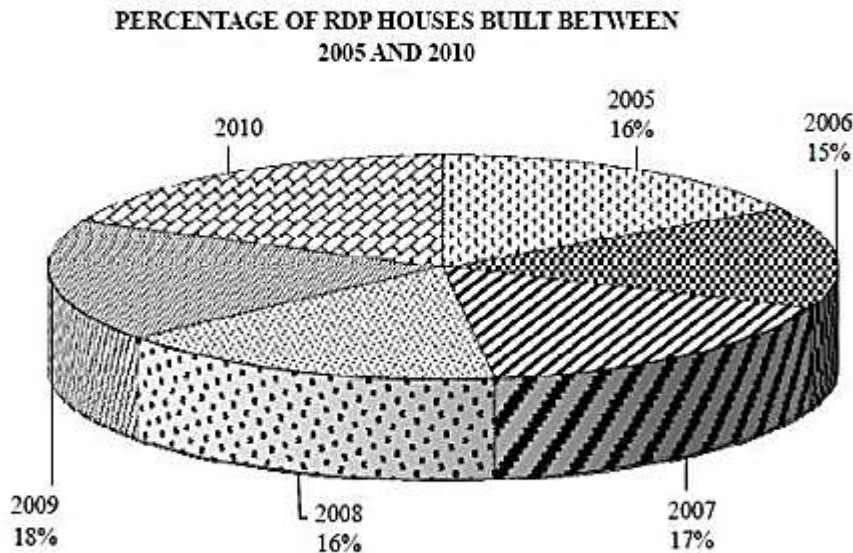
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 3:**

In 1994, the South African government introduced the Reconstruction and Development Programme (RDP) to address the socio-economic backlog of affordable housing.

The pie chart below shows the percentage of RDP houses that was built between 2005 and 2010.



Between January 2005 and December 2010, a total of 909 275 RDP houses was built.

[Source: [www.escc-net.org](http://www.escc-net.org)]

3.1 Determine the percentage RDP houses built during 2010. (2)


3.2 In which year was the smallest percentage of RDP houses built? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

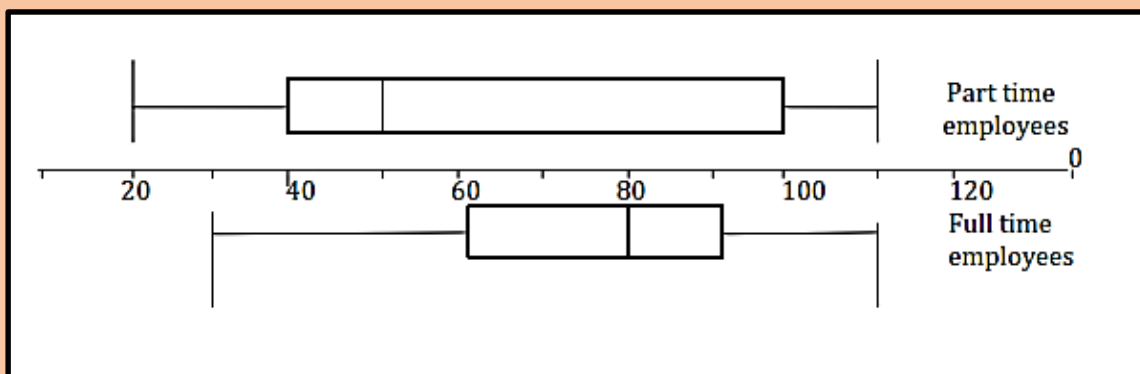
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.3 In which other year was the same percentage of RDP houses built as in 2005?  
(2)


3.4 Determine the number of RDP houses built during 2005. (3)


**QUESTION 4:**

Raasetja construction company has got a tender to build the RDP houses at Mokopane. Thbox and whisker plots below represents the salaries of both part time and full time employee (**Monthly salary R100**).The company had 80 part time employees and 20 full time employees. The salaries are paid according to the type of duty done by employees.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4.1 Which group of employees got the lowest salary? (2)


4.2 Which of the two groups (part time and full time) earns a better salary? Explain your choice. (3)


4.3 Calculate the Interquartile salary range for full time employees (3)


4.4 How many part time employees earn less than R3000? (3)


4.5 How many full time employees earn a salary higher than the upper quartile? (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Which categories of employees are earning a salary higher than the upper quartile? Name 2. (2)

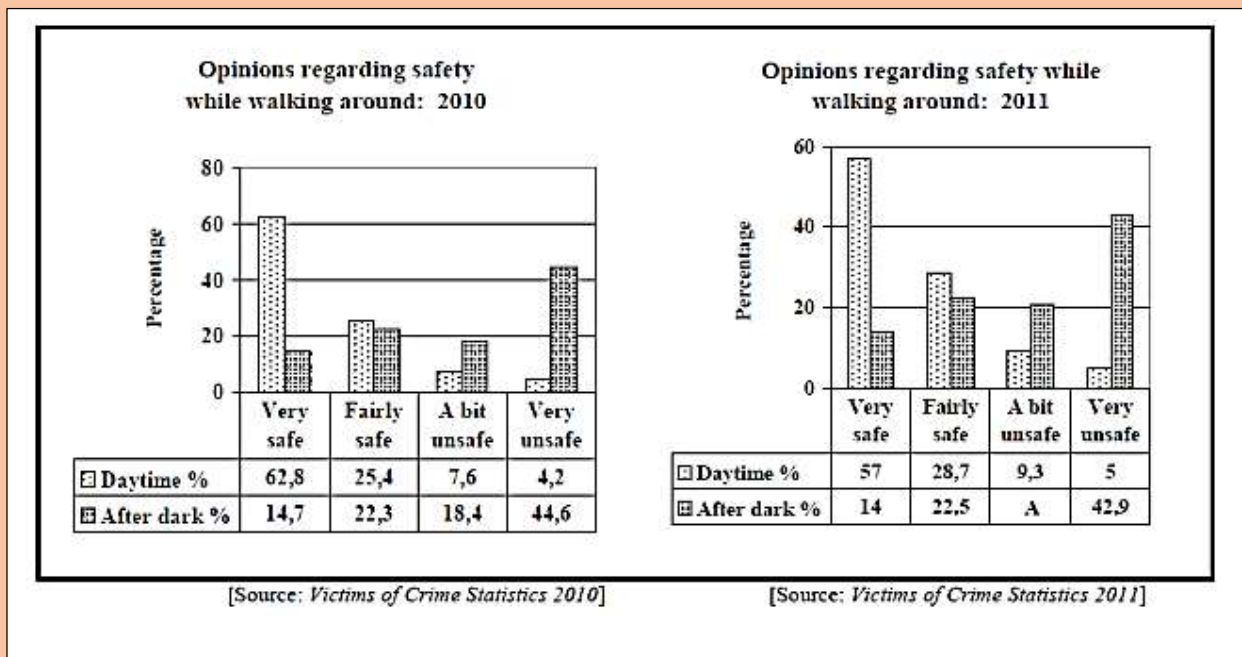

**SECTION B: NOTES ON CONTENT**

Whenever drawing graphs, remember the following:

- A heading, label both axes and fill in the units where necessary
- Spaces between the bars of a bar graph and no spaces between the bars of a histogram
- You are only expected to interpret the pie chart and not draw it
- You are only expected to interpret the box and whisker plots and not draw it

Towards the end of each year, crime statistics of the preceding year are released. The data is collected from official police reports and questionnaires handed out to a sample of households. One of the questions in the questionnaire asked the respondents how safe they felt walking around during daytime and after dark.

Study the graphs and data below and answer the questions that follow.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.1 Calculate the missing value **A** in the second graph. (2)


1.2 Identify the percentage of respondents who felt **a bit unsafe** while walking around during daytime in 2010. (2)


1.3 During which year did the largest percentage of respondents feel **fairly safe** while walking around after dark? (2)


1.4 At which time of the day (daytime or after dark) did most of the respondents in both years, 2010 and 2011, feel **very unsafe** while walking around? (2)

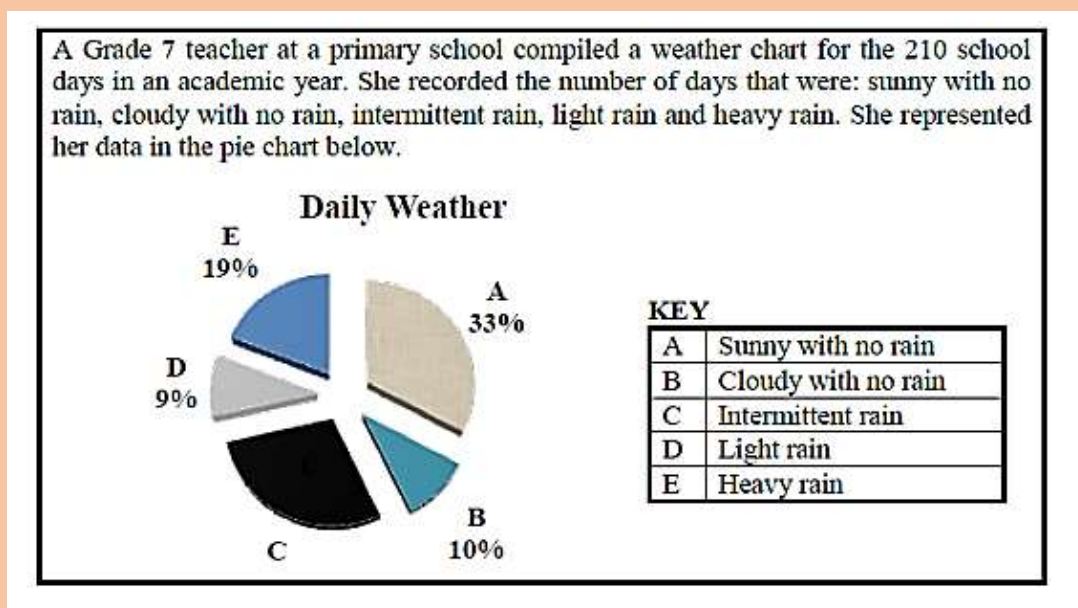

1.5 Determine the difference in the percentage of respondents who felt **very safe** walking around during daytime between 2011 and 2010. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.6 Write down the ratio of the percentage of respondents during 2011 who felt **very safe** walking around during daytime to those who felt **very safe** walking around after dark. Give the ratio in simplified form, rounded off to the nearest whole number. (2)


### Question 2



2.1 Calculate the percentage of days when there was intermittent rain. (2)


2.2 Determine the total number of school days when there was no rain. (3)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Revision

### FINANCIAL DOCUMENTS,COST PRICE & TAXATION

Revise your conversion skills. Always round off the money to 2 decimal places. Read the context before answering the questions. You should be able to convert currency and time. You should be able to work with percentage

Thabo Mkhize is a businessman who visits various capital cities in Africa.

TABLE 1 below shows the exchange rate between eleven African currencies, United States dollar (US\$) and the South African rand (ZAR).

**TABLE 1: Exchange rate table for African currencies**

CURRENCY	AMOUNT IN US\$	AMOUNT IN ZAR
1 Algerian dinar	0,013592	0,10380
1 Angolan kwaza	0,010524	0,08160
1 Botswana pula	0,136131	1,05500
1 Egyptian pound	0,165683	1,28500
1 Ghanaian cedi	0,568235	4,41000
1 Kenyan shilling	0,012040	0,09340
1 Mozambican metical	0,036394	0,00030
1 Malawian kwacha	0,006009	0,04665
1 Nigerian naira	0,006345	0,04925
1 South African rand	0,128990	1,00000
1 Zambian kwacha	0,000189	0,00150

[Source: [www.coinmill.com](http://www.coinmill.com), 1 May 2012]

1.1.1 Which country had an exchange rate of US\$ 0,012040 to ONE unit of its currency? (2)


1.1.2 Which of the currencies above gives you the largest amount in US\$ for ONE unit of the currency? (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.1.3 Thabo's accommodation in Zambia costs 25 976,87 kwacha. Convert this amount to US\$. (2)


1.1.4 Thabo bought goods in Ghana to the value of 1 345 cedi. Calculate the value, in rand, of the goods Thabo had bought. (2)


Navin's company collected information during 2011 relating to the cost of producing television advertisements. The company released the following information:

- 640 advertisements were produced in 1 760 shoot days\*.
- 219 of the advertisements were produced in high definition\*\*.
- The average cost of producing an advertisement is R1 349 531.

\* A shoot day refers to the number of regulated working hours per day to film an advertisement.  
\*\* High definition pictures are of a better quality than ordinary pictures.

[Source: [www.cpasa.tv](http://www.cpasa.tv)]

1.2.1 Calculate the average number of shoot days it takes to produce ONE advertisement. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2.2. Calculate the total cost of producing advertisements in high definition if the cost per advertisement is the same as the average cost. (2)


1.2.3 Determine how many advertisements were NOT produced in high definition.(2)


1.2.4 In 2011, the hiring cost of equipment used for the filming of one television advertisement was 16% of the cost of producing the advertisement. Calculate the hiring cost during 2011. (2)


1.2.5 The average cost of producing an advertisement in 2011 was 40% more than the average cost of producing an advertisement in 2005. Calculate the average cost of producing an advertisement during 2005. (3)


[19]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 2:**

Moipone is planning a trip from Port Elizabeth (PE) to Thohoyandou to attend her friend's wedding. She will fly from PE to OR Tambo (Johannesburg) and then catch another flight from OR Tambo to Polokwane. At Polokwane airport she will hire a car and drive to Thohoyandou. She plans to leave PE on 10 April 2014 in the morning and she would like to arrive in Thohoyandou before dark on the same day. She finds the following information on the internet:



**From PE to OR Tambo on 10 April 2014:**

Depart	Arrive	Airline	Flight no.
06:10	07:45	SAA	SA 1460
08:20	09:55	SAA	SA 2060
10:50	12:30	SAA	SA 406
12:25	14:15	SAA	SA 1486
13:30	15:05	BA	BA 6242

**From OR Tambo to Polokwane on 10 April 2014:**

Depart	Arrive	Airline	Flight no.
11:40	12:40	SAA	SA 8809
14:20	15:20	SAA	SA 8817
17:05	17:55	SAA	SA 8815

2.1 What is the departure time of the earliest flight out of PE? (2)


2.2 At what time does flight SA 2060 arrive at OR Tambo? (2)


2.3 What is the duration of the flight between PE and OR Tambo on flight SA 1486? (2)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.4 Moipone has booked flight SA 8817 from OR Tambo to Polokwane. She needs to be at OR Tambo an hour before her flight leaves for Polokwane. What is the latest flight Moipone can take from PE if she is to catch flight SA 8817? Explain how you get your answer. (4)


2.5 After landing at Polokwane airport, it takes Moipone 45 minutes to disembark, to retrieve her luggage and to collect the rental car. The 110 km drive from Polokwane airport to Thohoyandou takes one hour and 30 minutes. At what time will Moipone arrive in Thohoyandou? (4)


The company from which Moipone will hire a car on 10 April after landing at Polokwane airport supplied her with the following information:

Vehicle	1-6 days		7-13 days		14-29 days	
	L	H	L	H	L	H
V.W Polo vivo	288	303	275	290	250	263
Kia Rio	311	329	299	315	271	285

- Prices are per day in ZAR (South African Rand).
- A day is 24 hours or part thereof.
- Unlimited kilometres
- **2 Seasons:**
- H = High: 1 Nov 2013 – 30 April 2014
- L = Low: 1 May 2014 - 31 October 2014

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.6 If Moipone intends to fly back to PE on 13 April 2014 and she decides on hiring the Kia Rio, calculate what it will cost her to hire the car to drive from Polokwane airport to Thohoyandou and back. (4)


[18]

**QUESTION 3:**

Rodney's wife is 66 years old. Her taxable income for 2012 was R315 054. The amount of tax payable is calculated using the following table:

<b>TABLE 3: Tax calculation table TAXABLE INCOME (in rand)</b>	<b>RATES OF TAX (in rand)</b>
0 to 160 000	18%
160 001 to 250 000	28 800 + 25% of the amount above 160 000
250 001 to 346 000	51 300 + 30% of the amount above 250 000
346 001 to 484 000	80 100 + 35% of the amount above 346 000
484 001 to 617 000	128 400 + 38% of the amount above 484 000
617 001 and above	178 940 + 40% of the amount above 617 000

[Source: [www.sars.gov.za](http://www.sars.gov.za) on 17 November 2012]

Taxpayers qualify for:

- A primary rebate\* of R11 440
- An additional rebate\* of R6 390 if they are 65 years or older

3.1 Calculate her monthly rebate (3)

--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.2 Determine the monthly tax payable by Rodney's wife (7)


[10]

**QUESTION 4:**

A construction company who built a number of RDP houses employed workers for 8 hours per day working a 5-day week. They were paid a normal rate of R40 per hour.

Determine the normal weekly wage per employee.

Use the formula: **Weekly wage (in rand) = number of days worked × number of hours per day × rate per hour**

4.1.1 The owner paid the employees an overtime rate of R50 per hour. (2)


4.1.2 Write the ratio of the overtime rate to the normal rate in simplified form. (2)


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4.2 If one of the employees received R350 for overtime worked in a given week, determine the number of hours he worked overtime. (2)


4.3 Ferdi planned to take 2 hours unpaid leave, but still wanted to earn a weekly wage of R1 920. If he worked 38 normal working hours, calculate how many hours he had to work overtime to earn this wage. Use the formula: (3)

**Number of overtime hours** = 
$$\frac{\text{weekly wage} - (\text{number of normal working hours} \times 40)}{50}$$


### Question 5

Longhorn Heights High School needs R7 000,00 to buy a new computer. The finance committee decides to sell raffle tickets to raise funds. A food hamper donated by one of the school's suppliers will be the prize in the raffle.

*A raffle is a way of raising funds by selling numbered tickets. A ticket is randomly drawn and the lucky ticket holder wins a prize.*

The committee decides to sell the raffle tickets at R2,00 each. The tickets will be divided evenly amongst a number of ticket sellers.

5.1. Write down a formula that can be used to calculate the number of tickets to be given to each ticket seller in the form:

**Number of R2,00 tickets per seller = ...**


Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

TABLE 2 below shows the relationship between the number of ticket sellers and the number of tickets to be sold by each seller.

Number of ticket sellers	<b>P</b>	20	25	35	50	100	125	140
Number of tickets per seller	250	175	140	100	70	35	<b>Q</b>	25

5.2.1 Identify the type of proportion represented in TABLE 2 above. (2)


5.2.2 Calculate the missing values **P** and **Q**. (4)


5.2.3 Use the information in TABLE 2 or the formula obtained in QUESTION 1.1 to draw a curve on ANNEXURE A to represent the number of ticket sellers and the number of tickets sold by each seller.

The finance committee changed their plan and decided to sell the tickets at R5,00 each instead.

5.3.1 Give a possible reason why they made this decision. (3)


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5.3.2 State ONE possible disadvantage of increasing the price of the tickets. (2)

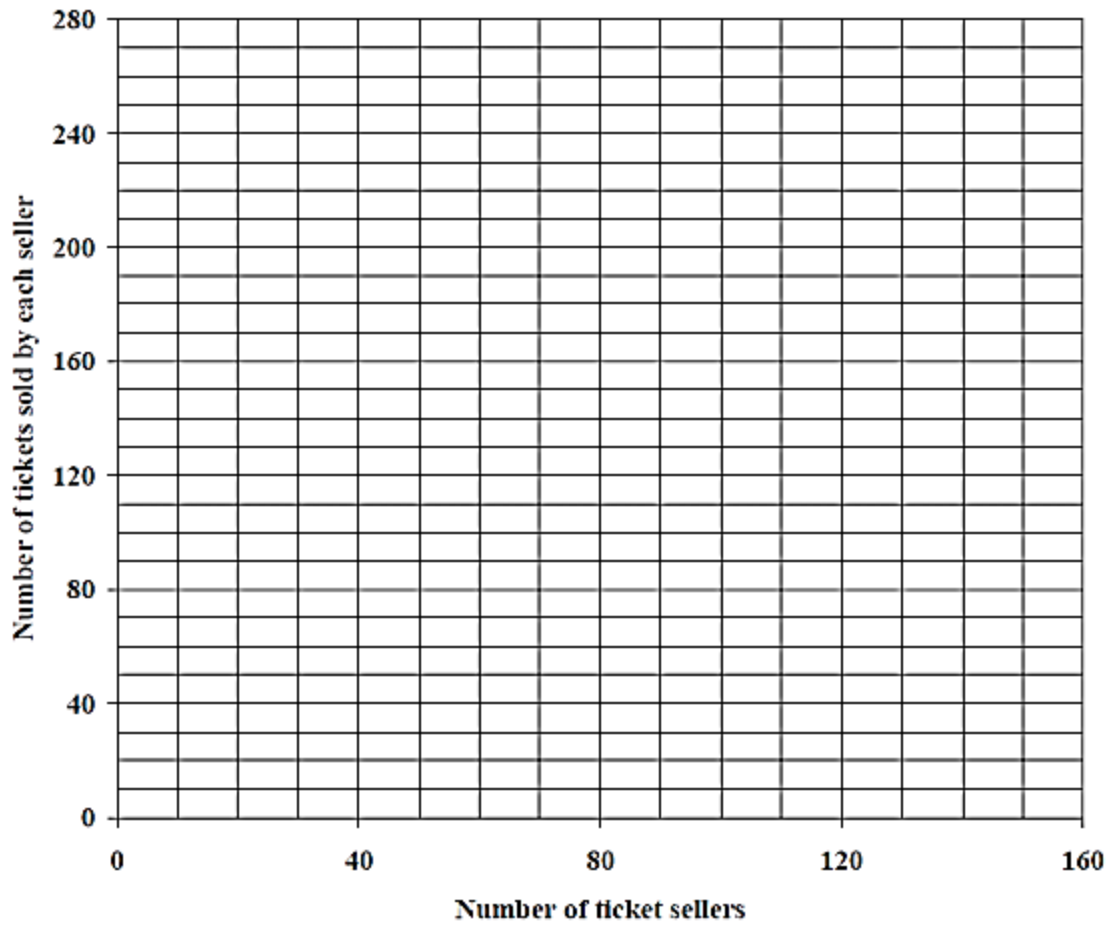

5.3.3 Draw another curve representing the number of ticket sellers and the number of R5,00 tickets sold by each seller on the graph paper below. Show ALL the necessary calculations. (8)

5.3.4 Use your graph, or otherwise, to calculate the difference between the number of R2,00 and R5,00 tickets that must be sold by 70 ticket sellers, assuming that all ticket sellers sell their tickets (3)


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### SALE OF RAFFLE TICKETS



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## Probability

Many things in life can't be predicted with certainty.

The best we can say is how likely they are to happen, using the idea of probability.

Probability helps us to interpret information in many real-life situations, such as:

- drug and pregnancy tests
- risk analysis in business
- working out all the possible combinations of items
- games of chance, such as cards, dice and gambling
- weather forecasts
- risks of veld fires and lightning
- advertising.

In all of the above situations, people use probability to decide how likely it is that something will happen.

### The probability scale

Probability can be described as a fraction, a decimal or a percentage. The probability of any event is given a number between 0 (impossible) and 1 (certain).

In words:	Impossible	Even chances	Certain
As decimal fractions:	0	0,5	1,0
As fractions	0	$\frac{1}{2}$	1
As percentages	0%	50%	100%

### Words you need to know

- Frequency: The number of times that something happens.
- Random: When something happens without being made to happen on purpose.
- trial: A test. Throwing a dice and tossing a coin are examples of a trial.
- Fair: Treated equally, without having an advantage or disadvantage.

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- theoretical probability: The calculated probability, not the actual

### Example

Write down the chances of getting the outcomes in the following situations. Write your answers as decimals, percentages and common fractions.

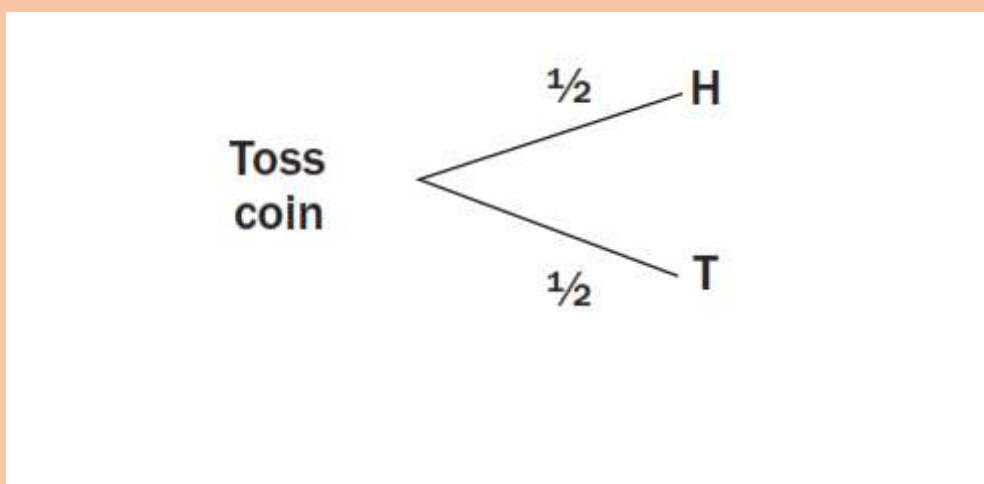
- Getting any odd number when throwing a dice once.
- Getting a 3 when throwing a dice with 8 faces.
- The arrow of this spinner lands on a colour randomly when you spin it. What are the chances of landing on red?
- You take out a T-shirt (without looking!) from a pile which has 1 blue, 3 green and 2 purple T-shirts in it. What are the chances of taking out a purple T-shirt?

#### Solutions

- The odd numbers on a dice are 1; 3; 5. So there are 3 numbers. There are six numbers in total, so the chances are  $\frac{1}{2} = 0,5 = 50\%$ .
- The 3 is only one number out of a total of 8 possible numbers. So the probability is  $\frac{1}{8} = 0,125 = 12,5\%$ .
- Two of the parts are red. There are five parts in total. So the probability is  $\frac{2}{5} = 0,4 = 40\%$ .
- There are 2 purple T-shirts. There are 6 T-shirts in total. This means the probability of taking out a purple one is  $\frac{2}{6} = \frac{1}{3} = 0,33... = 33\frac{1}{3}\%$ .

### Using tree diagrams

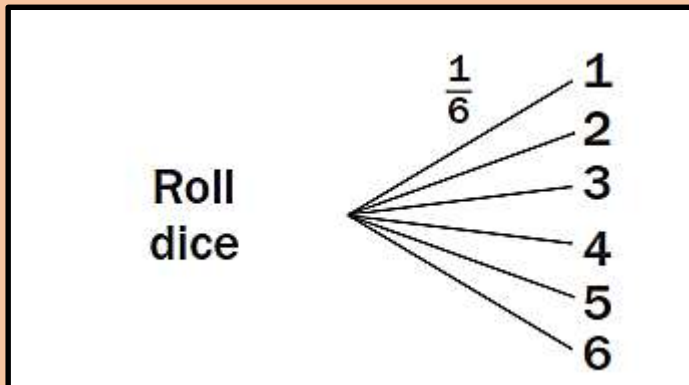
The branches of a tree diagram show these probabilities.



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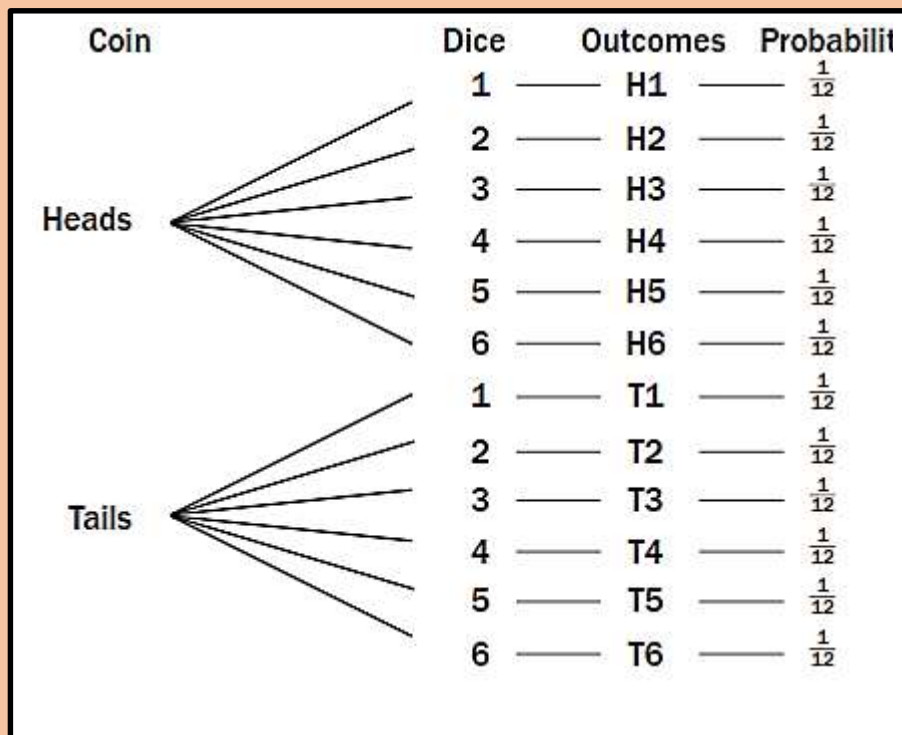
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If we roll a dice the tree diagram would look like this.



Example

The tree diagram below shows all the possible outcomes for tossing a coin and then throwing a dice.



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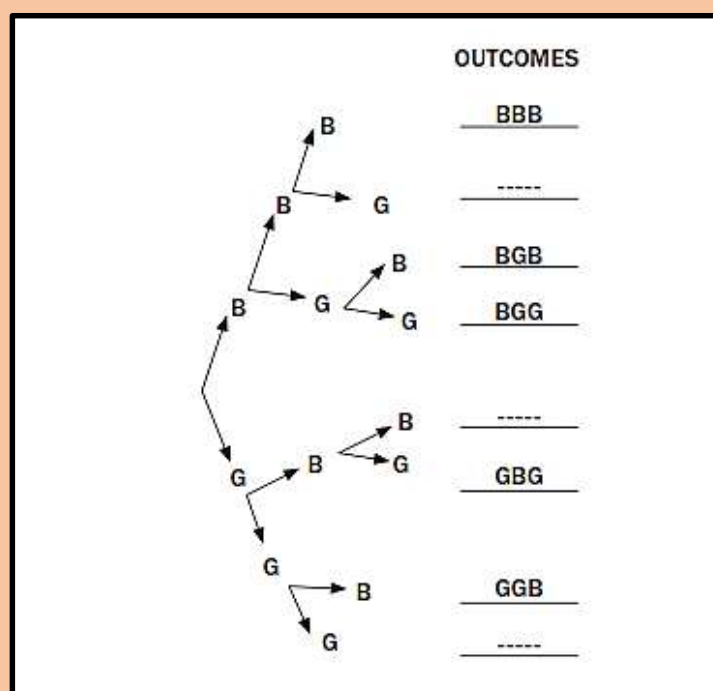
- How many possible outcomes are there? List them.
- What is the probability of getting each outcome? Write this probability as a fraction, a decimal (rounded off to 2 decimal numbers) and a percentage.
- How many of the 12 possible outcomes include getting an even number on the dice?
- How many of the 12 possible outcomes include getting Tails and an even number?
- How many of the 12 possible outcomes include getting a 5 on the dice?

### Solutions

- There are 12 possible outcomes altogether: H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6.
- The probability is  $\frac{1}{12} = 0,08 = 8\%$ .
- Six possible outcomes (H2; H4; H6; T2; T4; T6).
- Three possible outcomes (T2; T4; T6).
- Two possible outcomes (H5 and T5).

### Example

The Moyanas are planning to have three children. A tree diagram showing all possible combinations of boys and girls in a family of three children has been drawn below.



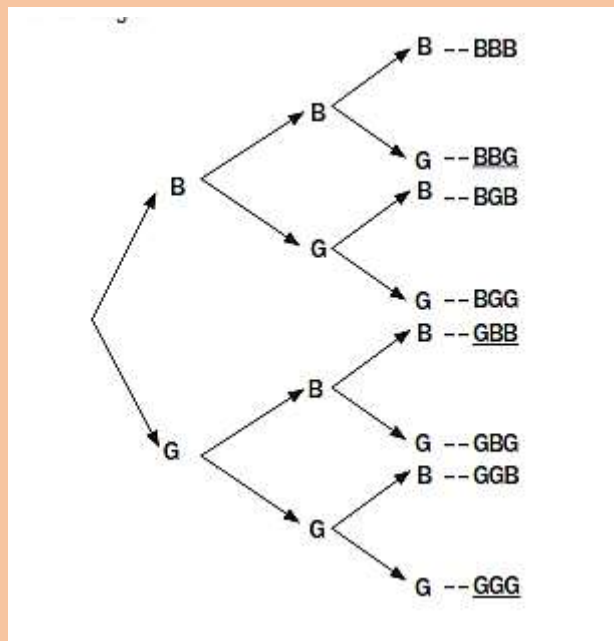
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- Complete the tree diagram by filling in the missing outcomes.
- What is the probability of the Moyanas having at least two girls?
- List ALL the outcomes where she can have two boys and one girl.

### Solutions

- Completed tree diagram:



- “At least” means 2 or 3 girls. The probability is

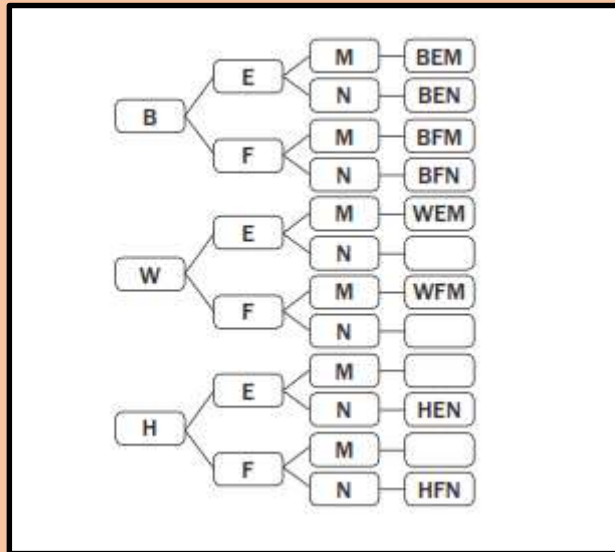
c) BBG, BGB and GBB.  $= \frac{4}{8} = 50\% = 0,5$ .

### Exercise

Sandwiches will be prepared for morning tea. The sandwiches are made from an equal number of white (W), brown (B) and whole-wheat (H) loaves of bread. The fillings used for the sandwiches are egg (E) or fish (F), with (M) or without (N) mayonnaise. An incomplete tree diagram which could be used to work out the different combinations of sandwiches that could be made, is given below.

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1. Explain what the outcome BEM represents on the tree diagram. (1)


2. Complete the tree diagram. (4)


3. Use the tree diagram to write down the probability in simplified form that a sandwich selected at random would:

(a) be a whole-wheat fish sandwich without mayonnaise. (2)


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(b) not be a white bread sandwich. (2)


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### Using a two-way table to show combined outcomes

A two-way table (also known as a contingency table) works in a similar way to a tree diagram. We write the outcomes of one event in rows and the outcomes of the other event in columns. For example, this table shows all the possible combinations for tossing a coin twice.

	<b>H</b>	<b>T</b>
<b>H</b>	H, H	H, T
<b>T</b>	T, H	T, T

Can you see that there are 4 possible outcomes? Each block in the table will show a possible outcome of the combined events. Let's look at a worked example to understand this better.

### Example

a) Draw up a two-way table to show all the possible outcomes for tossing a red dice and a blue dice.

b) How many possible outcomes are there?

c) Now answer the following questions.

(i) What is the chance of rolling a 3 on the blue dice (and any number on the red dice)?

(ii) Write the probability of getting a 5 on the blue dice as a fraction, a decimal fraction and a percentage (round off your answers to 2 decimal places).

d) What is the chance of rolling a 4 on the red dice and a 2 on the blue dice?

e) What is the chance, in a single roll of both dice, of getting a 1 and a 2 of either colour?

### Solutions

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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a) For tossing a red dice and a blue dice we would have:

Blue/ Red	R1	R2	R3	R4	R5	R6
B1	(B1; R1)	(B1; R2)	(B1; R3)	(B1; R4)	(B1; R5)	(B1; R6)
B2	(B2; R1)	(B2; R2)	(B2; R3)	(B2; R4)	(B2; R5)	(B2; R6)
B3	(B3; R1)	(B3; R2)	(B3; R3)	(B3; R4)	(B3; R5)	(B3; R6)
B4	(B4; R1)	(B4; R2)	(B4; R3)	(B4; R4)	(B4; R5)	(B4; R6)
B5	(B5; R1)	(B5; R2)	(B5; R3)	(B5; R4)	(B5; R5)	(B5; R6)
B6	(B6; R1)	(B6; R2)	(B6; R3)	(B6; R4)	(B6; R5)	(B6; R6)

For example, (B1; R3) represents rolling a 1 on the blue dice and a 3 on the red dice.

b) There are 36 possible outcomes.

c) (i) The chance is  $\frac{6}{36} = \frac{1}{6}$

(ii) The probability of getting a 5 on blue dice =  $\frac{1}{6} = 0,17 = 16,67\%$

d) There is only one block on the table for this: (B2; R4), so there is a 1 in 36 chance of this outcome.

e) To get a 1 and a 2: could be (B1; R2) or (B2; R1), so there are two possible outcomes and hence a 2 in 36 chance. This simplifies to 1 in 18 or  $\frac{1}{18}$

## Exercise

Using a two-way table

You are putting together a gift pack for toddlers at a day-care centre. There are four possible toys, and a green, red or yellow box to pack them in. The toys are:

- coloured clay
- colouring-in book and crayons
- mini chalkboard and chalk
- pop-up story book.

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1. Look at this two-way table which shows the different gift packs you have made.

	Green	Red	Yellow
<b>A. coloured clay</b>	10	15	5
<b>B. colouring book and crayons</b>	7	20	3
<b>C. mini chalkboard and chalk</b>	12	25	8
<b>D. pop-up story book</b>	9	19	5

a) How many packs are there altogether? (6)


b) Which pack do you have the least of? (1)


c) Which pack do you have the most of? (1)


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2. The packs are taken out of a bag randomly and given to each child. Write your answers as common fractions.

a) What are the chances of a child getting any green pack? (2)


b) What are the chances of a child getting any yellow pack? (2)


c) What are the chances of a child getting a red box with a mini- chalkboard? (1)


d) What are the chances of a child getting a green box with coloured clay? (2)


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### MIXED QUESTIONS (Activity 4: Mixed questions about probability)

Read the news article extract carefully and answer the questions that follow.

"Lightning kills hundreds every year in South Africa"	
<p>More than 260 people are killed by lightning in South Africa each year, the SA Weather Service (SAWS) said on Wednesday. This figure is an annual average based on Statistics SA data between 1999 and 2007, when 2 375 lightning related deaths were reported.</p> <p>The Weather Service said it was likely that some deaths went unreported.</p> <p>'The year with the lowest recorded death rate was 2 000, when only about 205 [deaths] were reported.'</p>	<p>Most of the lightning fatalities happened in the Eastern Cape, closely followed by KwaZulu-Natal.</p> <p>Provinces with the second-highest risk were the Free State, Gauteng, and North West.</p> <p>Mpumalanga and Limpopo had slightly lower lightning risks, while the Northern and Western Cape had low incidences of lightning.</p> <p>(Source: Timeslive.co.za, 20 February 2013)</p>

1. Where did the SA Weather Service obtain the data for their report that more than 260 people are killed by lightning each year? (1)


2. Explain how SAWS obtained the figure of 260 for the number of deaths per year. Show the calculation. (3)


3. What kind of statistic is SAWS using when it reports this number? (1)


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4. SAWS says that it is likely that the number of deaths due to lightning is under-reported. Calculate what the mean would be if the actual number of deaths from 1999 to 2007 was 3 000. (2)


5. Were the deaths equally spread out among the nine provinces? Explain. (3)


6. Which information did SAWS use in order to arrange the provinces in order of risk? (2)


7. Consider these two scenarios of lightning related deaths:

- **Scenario A:** 100 deaths in one year in a province with a population of 10 000 000
- **Scenario B:** 20 deaths in one year in a province with a population of 1 000 000

Which of the scenarios indicates a higher probability of death due to lightning?  
Show your working. (5)


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8. Some relevant information is not given in this report. Explain. (4)


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**SESSION 1**

**TOPIC : FINANCE**

**QUESTION 1 [24 MINUTES]**


Solly lives in the Mtutulu Municipality. This means that he has to pay Mtutulu Municipality rates for the water and electricity that he uses monthly. Musa is currently on the flat rate electricity system. Below is one of the electricity bills that he received from the municipality:

The Mtutulu Municipality (Business Unusual)		44 High Street P.O. Box 321781		Tel: (098) 4328910	
Street Address		Client Name		Invoice Number	
Flat 3C Ladswood Heights		Mr. S. Van Heerden		WEST – ELEC7810457812	
Date	Consumption details	Tariff	Sub Total	VAT (14%)	Total Due
29/11	Previous reading: 114628 kWh  Current reading: 115353 kWh	R0,219 per kWh	R158,78	<b>A</b>	R181,01

- 1.1. How many kW of electricity did Solly use in November? (2)
- 1.2. How much VAT will Solly have to pay for the electricity he used in November? (2)
- 1.3. Show how the *Sub Total Charge* values of R158,78 was calculated (4)
- 1.4. In October Solly used 803 kWh of electricity. Calculate how much the Mtutulu Municipality would have billed him for his electricity consumption in October. (6)

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	Solly decided to save electricity consumption by Geyser blanket by using the electric blanket. It was discovered that the geyser blanket may save 20% of electric consumption.	
		
1.5.1	How does the geyser blanket help you to save energy?	(2)
1.5.2	Determine the amount of money she would save for using 803kℓ if she has covered her geyser with a blanket..	(8)
1.6.	Solly who is staying with his wife is sharing the payment of water bills with Tumi, the single mother of 3; and they agreed to share the bill proportionally according to the family members.	

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The following tariffs were used to determine the amount payable for month of October.

CATEGORIES	RANGE	Price per kℓ
1	0 – 12 kℓ	R0, 00
2	13kℓ– 28 kℓ	R7.96
3	29 kl – 60 kℓ	R13.55
4	More than 60 kℓ	R16,80

- 1.6.1 How much will Solly pay if the two families used 82 kℓ. (6)
- 1.6.2 Ledile said if she was not sharing the water bill, she would pay less. Verify her claim. (7)
- 1.6.3 Determine the VAT exclusive price if they paid R1214.05 (3)
- 1.6.4 How many kilo litres did they use, if their water bill was R1232.96 (VAT exclusive). (6)

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### QUESTION 2 [ 38 MINUTES]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- 2.1 Grade 12 learners from Funda High School are selling 2 litre cool drinks during lunch to raise funds for their matric farewell function. They have asked the principal to use the school tuck-shop. They bought a dozen for R96. They sold them for R15 each.



- 2.1.1 Calculate the profit they made per dozen cool drinks sold. (2)
- 2.1.2 How much did it cost for learners to buy 1 440 cool drinks (2)
- 2.1.3 Nosipho, one of the organisers said they will break even after selling half of cold drinks. Verify her claim. (3)

2.2	They decided to sell the cool drinks with the glasses of 250mℓ to make more profit. They bought the foam glasses in a pack of 50 for R37.50 .	

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2.2.1	Determine the profit they will make from selling a dozen of 2ℓ cool drinks in glasses if one glass is R6.00	(8)
2.2.2	They kept a record of items sold, and after 2 hours they discovered that out of 80 soft drinks sold, 48 of them were bought in glasses.	
(a)	Express the ratio of bottles sold to the cups sold.	(4)
(b)	Calculate the total income for the soft drinks sold over this period.	(5)
2.2.3	After 2 hours, they decided to sell refill at R5.50 per glass. Was this the wise decision? Use calculations to support your decision.	(9)

- 2.3 A parent of one of the learners wants to hire a car for her child's matric dance farewell. Car hire companies have different tariffs and benefits to offer. Parents will always compare these

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companies and choose the one that will give them the best value for their money. The tariffs of two companies are given below:

<b>AVIS CAR HIRE</b> R6,50 per kilometer	<b>BUDGET CAR HIRE</b> R165 plus R3,50 per kilometer
---	---



The table below shows the cost of the two options:

Kilometers travelled	10	20	40	<b>C</b>
Cost for Avis Car Hire	R65	<b>A</b>	R260	R455
Cost for Budget Car Hire	R200	R235	<b>B</b>	R410

- 2.3.1 Calculate the missing values A, B and C (6)
- 2.3.2 On the **diagram sheet (ANNEXURE A)** provided; draw two graphs showing the cost of AVIS CAR HIRE and the cost of BUDGET CAR HIRE. (6)
- 2.4 Use the graph or table to answer the following questions:
- 2.4.1 After how many kilometres will the cost of the two companies be the same? (2)
- 2.4.2 The child wants to travel 80km on a particular day. Which car hire company would be the cheaper for the parent, and by how much? Show all calculations. (3)

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- 2.5 The parent decides to go and buy the matric dance outfit for his child. He parks his car at the Pine Parkade. Carefully study the information on the Pine Parkade parking tariffs and answer the following questions.

<b>Welcome to PINE PARKADE</b>	
<b>Parking Tariffs Rates</b>	
<b>HOURS</b>	<b>RATE</b>
0 – 1	R13.00
1 – 3	R19.00
3 – 5	R25.00
5 – 6	R28.00
6 – 7	R35.00
7 – 24	R60.00
<b>Lost ticket administration fee = R60.00</b>	

- 2.5.1 He arrives at the parking lot at 11:05 and leaves at 14:10, determine the time spent at the parking lot and the amount paid. (2)
- 2.5.2 The driver has 15 minutes to exit the parking lot after making payment. He makes payment at 14:10. Determine the latest time she could leave the parking. (2)
- 2.5.3 If the driver loses the parking ticket, determine how much the charge will be. (2)
- 2.5.4 They had to go back to the complex to fit and buy accessories and shoes .If they spent 5 hours 45 minutes on the second day, how much did they pay for parking, for the 2 days. (2)

[58]

### QUESTION 3 [ 21 Minutes]

Ms Maseko is 56 year old general assistant at a Lindowake firm in Ikageng and earns a gross monthly salary of R9 857,30

The following amounts are deducted from her monthly salary:

- Union membership R28
- Pension fund 7,5 % of gross salary
- R10.00 UIF contribution
- Medical aid :  $\frac{1}{3}$  of total medical aid subscription fee due as shown below

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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Sindisa medical aid membership subscription cost

Gross monthly salary	Main member	Wife/partner	Each child
R0 –R9 000	R1 345	R890	R475
R9 001 –R11 500	R1 449	R974	R519
More than R11 500	R1 643	R1 066	R559

- 3.1. Calculate her annual salary.L1 (2)
- 3.2. Calculate her monthly pension fund contribution L2 (2)
- 3.3. Determine her annual UIF contribution.L1 (2)
- 3.4. Ms Maseko is a single parent with two children belonging to the medical fund. Use the table to calculate the monthly contribution to the medical aid. (3)
- 3.5 Calculate all the monthly deductions from Ms Maseko’s salary. (3)
- 3.6 Calculate her net salary. (3)
- 3.7. Determine her annual taxable income. (2)
- 3.8 Ms Maseko was promoted to a senior administrator in March 2015 and she earned a taxable income of R12 053.40 per month.
- 3.8.1 Determine the percentage increase of her taxable income. (3)  
You may use the formula:  
Percentage increase =  $\frac{\text{New taxable income} - \text{Previous taxable income}}{\text{Previous taxable income}}$
- 3.9 Use the tax table below to answer the following questions:
- 3.9.1 Does she qualify to pay tax? Explain. (3)
- 3.9.2 Determine her payable tax. (6)
- 3.9.3 The financial advisor said that she must register as a donor to reduce the tax.. Then she decides to donate 10% of her monthly taxable income to an orphanage. (4)  
Show by calculations how this will reduce the tax.

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**Tax rates (year of assessment ending 29/02/2016)**

Tax brackets	Taxable income	Rate of tax ( in rand)
A	0 – 181 900	18% of taxable income
B	181 901 – 284 100	32 742 + 26% of income above 181 900
C	284 101 – 393 200	59 314+31% of income above 284 100
D	393 201 – 550 100	93 135+36% of income above 393 200
E	550 101 – 701 300	149 619+39% of income above 550 100
F	701 301 and above	208 587 +41% of income above 701 300

**Tax rates (year of assessment ending 28/02/2015)**

Tax brackets	Taxable income	Rate of tax ( in rand)
A	0 – 174 550	18% of taxable income
B	174 551– 272 700	31 419 + 25% of income above 174 550
C	272 701– 377 450	55 957+30% of income above 272 700
D	377 451– 528 800	87 382+35% of income above 377 450
E	528 801– 673 100	140 074+38% of income above 528 800
F	701 301 and above	195 212 +40% of income above 673 100

Tax Rebates		
	2016	2015
Primary	R13 257	R12 726
Secondary( 65 years to less than 75 years)	R7 407	R7 110
Tertiary ( 75 years old and above)	R2 466	R2 367
Tax Threshold		
	2016	2015
Primary	R73 650	R70 700
Secondary( 65 years to less than 75 years)	R114 800	R110 200
Tertiary ( 75 years old and above)	R128 500	R123 350
Medical aid credits in respect of monthly contributions		
Tax Rebates	2016	2015
Tax payer only	R270	R257
First dependant	R270	R257
Additional dependants	R181 each	R172 each

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## EXTRA RESOURCES FOR FINANCE

### QUESTION 4

RHG is a dance company. The company has a bank account with Nedbank. The bank statement dates run from the 15th of the month to the 14th of the next month. Below is part of RHG's Bank Statement for a certain period in 2016.

DETAILS	DEBITS	CREDITS	DATE	BALANCE
Balance brought forward			19/04	28 955,47
Bank Statement			20/04	28 955,47
Cash deposit		2 239,10	21/04	31 194,57
Cheque 696	850,00		23/04	A
Stop order from NGK		3 100,00	25/04	33 444,57
Cash deposit		110,00	29/04	33 554,57
Service fee	44,20		01/05	33 510,37
Monthly account fee	55,00		01/05	33 455,37
Transaction charge	33,00		01/05	33 422,37
Cash deposit fee	116,26		01/05	33 306,11
Administration charge	8,00		01/05	33 298,11
Cash deposit		500,00	02/05	33 798,11
Cheque 697	B		02/05	33 540,64

**Note: Service fees are reflected on the day of the transaction but deducted at the end of the month.**

- 4.1. Write down RHG's bank balance on 19/04/2016. (2)
- 4.2. Determine the total amount deposited in RHG's account from 19/04 to 02/05. (2)
- 4.3. Calculate the missing values A and B. (4)
- 4.4. On 21/04 the service fee for depositing the amount of R2 239,10 was R31,74. Determine the service fee as a percentage of the deposited amount. (3)
- 4.5. Write down the approximate number of weeks that this part of the Bank Statement covers. (2)

[13]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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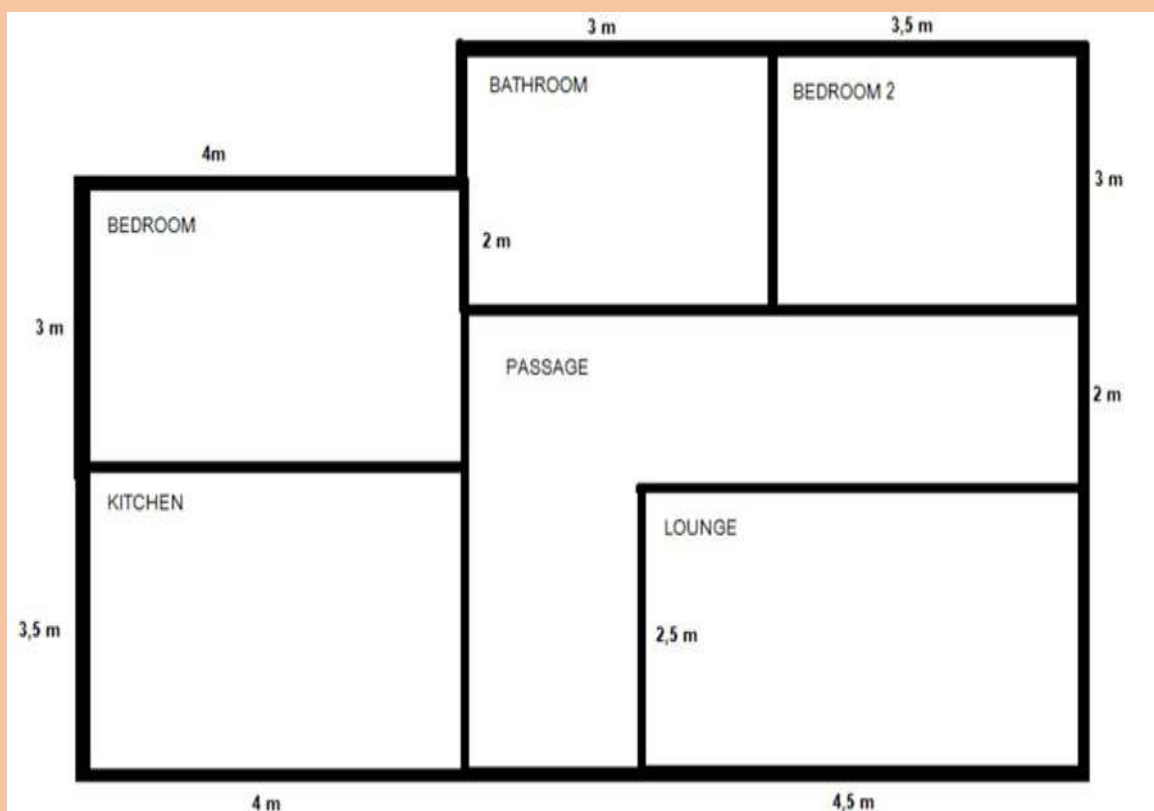
## SESSION 2

### MEASUREMENT

DURATION: 90 MINUTES

#### QUESTION 1

1. Jean-Pierre is planning on building a new house for his family. Below are the proposed dimensions of the house. Use the information given below to answer the questions that follows



- a) Jean-Pierre wants to tile the bathroom floor. (6)  
How many 550 mm x 550 mm tiles does Jean-Pierre need to tile the bathroom?
- b) The tiller can lay tiles at a rate of \_\_\_\_\_ per hour. How long will it (4)  
take him to tile the bathroom? (Round off to the nearest minute.)
- c) The builder recommends to Jean-Piere that he buys 10% (6)  
more tiles than required in case of breakages. The tiles he likes are R 234 for a box of 6 tiles.  
How much does Jean-Piere spend on tiles?

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- d) Calculate the cost of tiling the bathroom per meter squared. (5)  
Include the cost of the labour (R 130/hour or part thereof),  
grouting ( $1 \times 5\text{Kg bag @ R } 46.90$ ),  
adhesive ( $3 \times 20\text{ Kg bags @ R } 69.90/\text{bag}$ ) and spacers  
( $1\text{ pack } 10\text{ mm spacers @ R } 14.50$ ) needed for the entire  
job.
- e) The walls of the house are 8 feet tall, convert this to (3)  
meters.  $1\text{ foot} = 0.3048\text{ m}$
- f) Jean-Piere is told that one litre of paint will cover  $10\text{ m}^2$  of (7)  
the wall. Calculate the number of litres of paint he needs to  
do 2 coats of paint on the bathroom walls
- g) Jean-Piere can buy paint in a 1l can (R 149) or a 2.5l can (4)  
(R 259). How much will the paint for the bathroom walls  
cost?
2. Jean-Piere has decided to put carpets into the bedrooms. (10)  
Use the diagram from Question 1 to determine how many  
metres of carpeting Jean-Piere needs to buy to carpet the  
two bedrooms, and calculate the area of the carpet that is  
wasted due to off cuts.
3. **Carpeting requires the following:** (5)  
Underlayment  $R\ 75\text{ per linear meter}$   
2 x Rolls of adhesive  $R\ 95\text{ each}$   
Carpeting  $R\ 890\text{ per linear meter}$   
Labour  $R\ 1\ 200\text{ per day}$   
Calculate the total cost of carpeting the bedrooms if the job  
takes 1 day.

**GRAND TOTAL: 50 MARKS**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## ADDITIONAL RESOURCES

### QUESTION 1

One of the oldest professional surfer gatherings in the world, the Mr Price Pro, has earned legendary status in the world of surfing since it started in 1969. At that stage it was known as the Gunston 500. Shaun Thomson, a Durbanite, won the competition every year from 1973 to 1978.



[Source: <http://www.mrpricepro.com/Default.aspx>]

The banner above has been designed by an American company. It is 0,2 mile long and 27 feet wide.

- 1.1 Calculate the dimensions in metres.
- 1 mile = 1 609 m and 1 foot = 0,305 m (4)
- 1.2 Calculate the area (in m<sup>2</sup>) of a smaller Mr Price Pro - banner if the measurements are 6,3 m by 2,4 m.
- Use the formula: **Area of banner = length × width** (2)
- 1.3 The banner with a length of 6,3 m and a width of 2,4 m has to be hemmed with ribbon. The ribbon's price is R4,99 per 50 cm.
- 1.3.1 What is the price of one metre of ribbon? (2)
- 1.3.2 Calculate the perimeter of the banner. Provide the answer in metres.

$$\text{Perimeter} = 2 \times \text{length} + 2 \times \text{width} \quad (2)$$

[10]

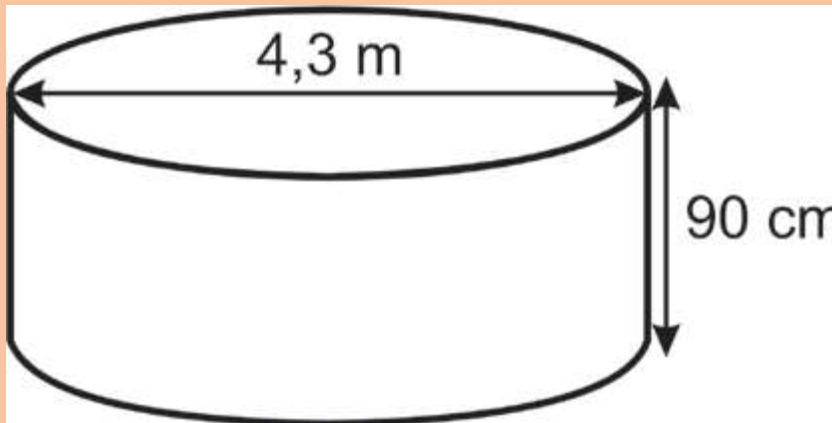
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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## QUESTION 2

Themba's last successful project was digging a cylindrical hole to secure a trampoline for his children.

**The dimensions of the hole he dug**



Although Themba has reused some of the excavated (dug up) sand, he still has two-thirds of the sand left over. A company is prepared to collect the sand free of charge provided it is more than  $5 \text{ m}^3$ .

- 2.1 Calculate the area of the base of the hole in square metres, rounded off to 2 decimal places.

$$\text{Area} = \pi \times r^2 \quad , \text{ where } r = \text{radius and } \pi = 3,14 \quad (3)$$

- 2.2 Determine, showing all calculations, whether there is enough sand for the company to come and collect free of charge.

$$\text{Volume} = \text{Area of base} \times \text{height} \quad (5)$$

**[8]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### QUESTION 3

Water is scarce in South Africa. The annual average rain fall is 446 mm. According to Statistics South Africa ([www.statssa.gov.za](http://www.statssa.gov.za)) 88,6% of the South African population has access to drinking water. The measurements of a water tank are given in metres. The water tank's radius is 14 m and its height is 10m.



- 3.1 Determine the diameter of the water tank. (2)
- 3.2 The lid of the water tank must be painted on the outside in order for it to be clearly visible.  
Calculate the area of the lid (in  $\text{m}^2$ ) if the radius is 14 m.  
Use the formula: **Area** =  $\pi \times (\text{radius})^2$  , where  $\pi = 3,14$  (2)
- 3.3 A one litre tin of paint covers an area of  $15 \text{ m}^2$ . Calculate the size of the area that can be covered with 17 litres of paint. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- 3.4 The inside of the tank must be sealed with waterproof paint. The lid does not get waterproofed on the inside. Calculate the interior surface area (in  $\text{m}^2$ ) by using the following formula.

$$\text{Inside area} = (2 \times \pi \times r \times h) + (\pi \times r^2)$$

$$\pi = 3,14$$

$r$  = radius

$h$  = height / depth of the water tank (3)

- 3.2 Calculate the volume of water (in litres) that can be contained by the water tank.

Use the formula:  $\text{Volume} = \pi \times r^2 \times h$

$$\pi = 3,14$$

$r$  = radius

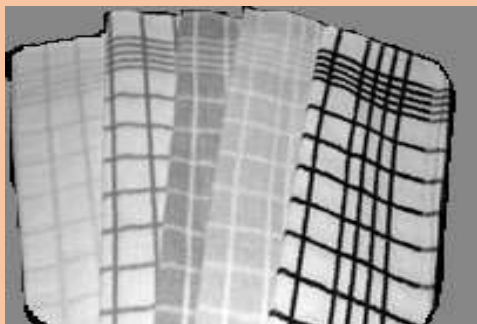
$h$  = height / depth of the water tank

and  $1 \text{ m}^3 = 1\,000$  litres

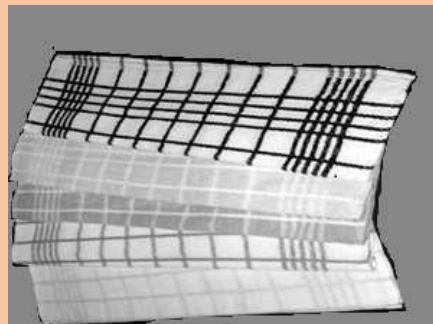
(3)  
[12]

#### QUESTION 4

- 4.1 Zimkitha buys some material to make dish clothes and tea towels which she sells at a local flea market. The material she buys has a fixed width of 120 cm and is cut into any required length. She cuts the material into rectangular pieces of 30 cm  $\times$  45 cm to make the tea towels and 30 cm  $\times$  30 cm to make the dish cloths, as shown in the photographs below.



Dish Cloth



Tea Towel

- 4.1 Calculate the area of the material needed to make ONE tea towel.

You may use the formula:

(2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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**Area of a rectangle = length × breadth**

4.2 Zimkitha wants to make a decorative border on some of the tea towels.

Calculate the perimeter of a tea towel.

You may use the formula:

**Perimeter of a rectangle = 2(length + breadth)** (3)

[7]

### SESSION 3

#### MAPS AND PLANS

#### QUESTION 1 [ 35 Minutes]

Study the map of the Johannesburg City Centre, **ANNEXURE A**, and answer the questions below.

- 1.1. The traffic in Catherine Road (**Grid B2**) can only flow in one direction. What is this direction of flow? (2)
- 1.2 What do we call streets that only flow in one direction? (2)
- 1.3 Name any street where the traffic can only flow in an easterly direction. (2)
- 1.4 Give the grid reference of the Johannesburg College of Education. (2)
- 1.5 Marcia wanted to visit the Johannesburg Art Gallery (**Grid C3**). The person who directed her gave her the wrong directions and she found herself at the City Hall (**Grid B3**). Give Marcia detailed directions how to walk from the City Hall to the Johannesburg Art Gallery (3)
- 1.6 Write the scale of the map as 1 : ... Show all calculations. (3)
- 1.7 Marcia and her friend, Zoe, came from different directions to the Johannesburg Station (**Grid B3**). Marcia travels from the City Hall and Zoe from the Civic Centre (**Grid B2**). With the necessary calculations, who will be walking the shortest distance in metres? (6)

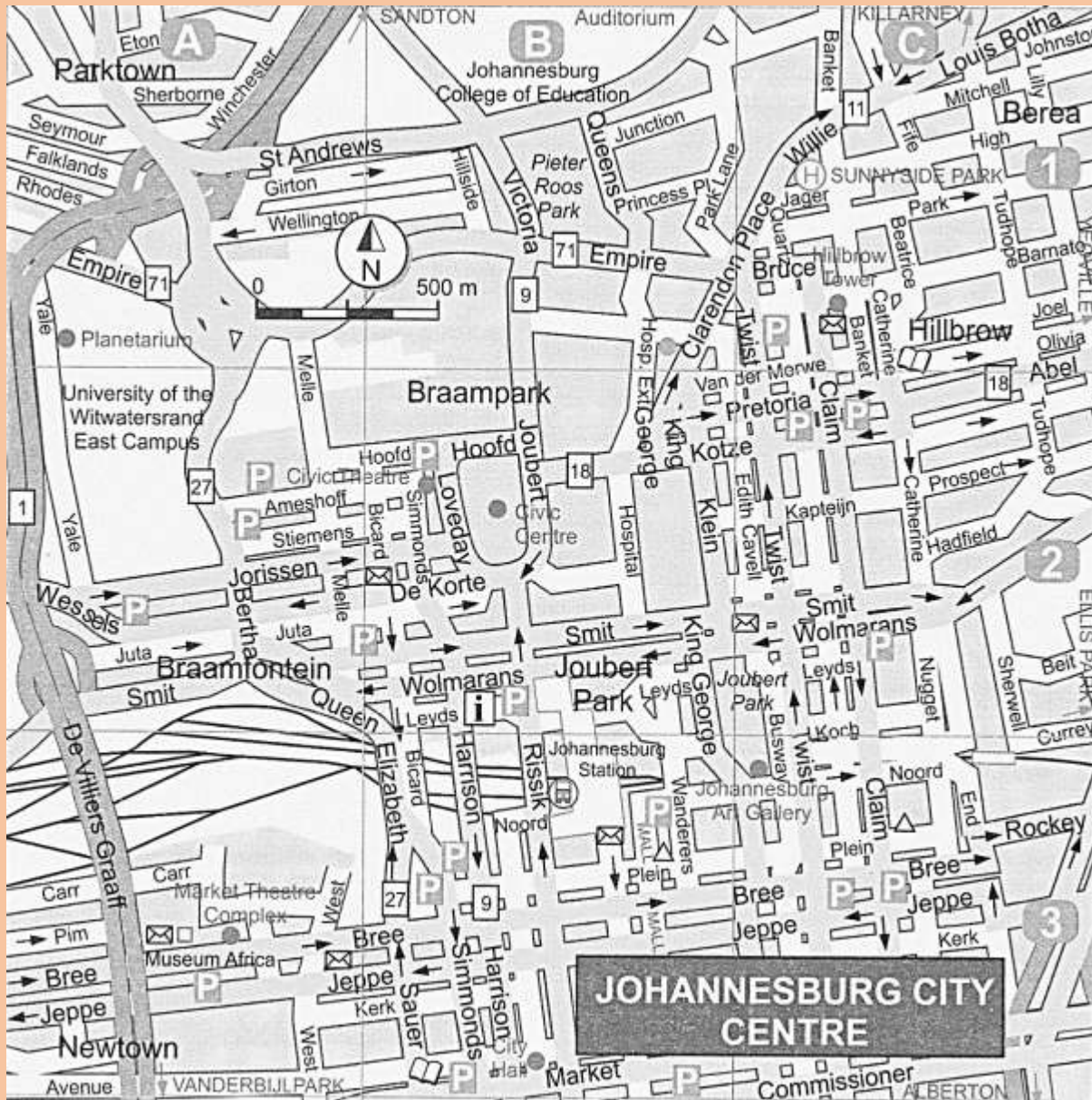
**HINT:** Use the centre of the dots as your starting points and follow the roads.

[20]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE A



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## QUESTION 2 [35 Minutes]

The Mothei family are using a strip map which indicates the distance between Upington and East London. Mr Mothei obtained the map from the Automobile Association (AA) website. They live in Upington and are on their way to East London to visit their relatives. Xolani, the 17 year old boy, folded the map when they reached Britstown. He was reading the map to determine the distances between the towns. Use the folded strip chart in **ANNEXURE B** to answer the questions which follow.

- 2.1 How far were they from Upington when they reached Britstown? (2)
- 2.2 Determine the approximate distance that they still had to travel from Britstown to East London. (2)
- 2.3 Name the National Road on which they were travelling between Britstown and Cradock and calculate the distance between those 2 towns. (3)
- 2.4 According to the map the distance between Cradock and East London is 284 km. Calculate the time (in hours and minutes) that it took Mr Mothei to drive between these two places if he was driving at an average speed of 93,3 km/h.

You may use the following formula:

$$Time = \frac{distance}{average\ speed} \quad (5)$$

- 2.5 On their return trip they used another route to experience the way people live in other towns. Below is a description of the routes they used from East London.
- Travelled along the coast on the R72 to Port Alfred
  - At Port Alfred they turned right onto route R67 to Grahamstown
  - At Grahamstown they continued onto route 350 and turned to the left onto route 400. They continued until they reached the T-junction at the R75. They turned to the right.





Use the above description above to determine the first town that they will reach after taking the turn to the right.

- 2.6 Determine the scale of the map if 3,7 cm on the map represents 95 km. Write the scale in the form 1 : ..... (3)

**[18]**

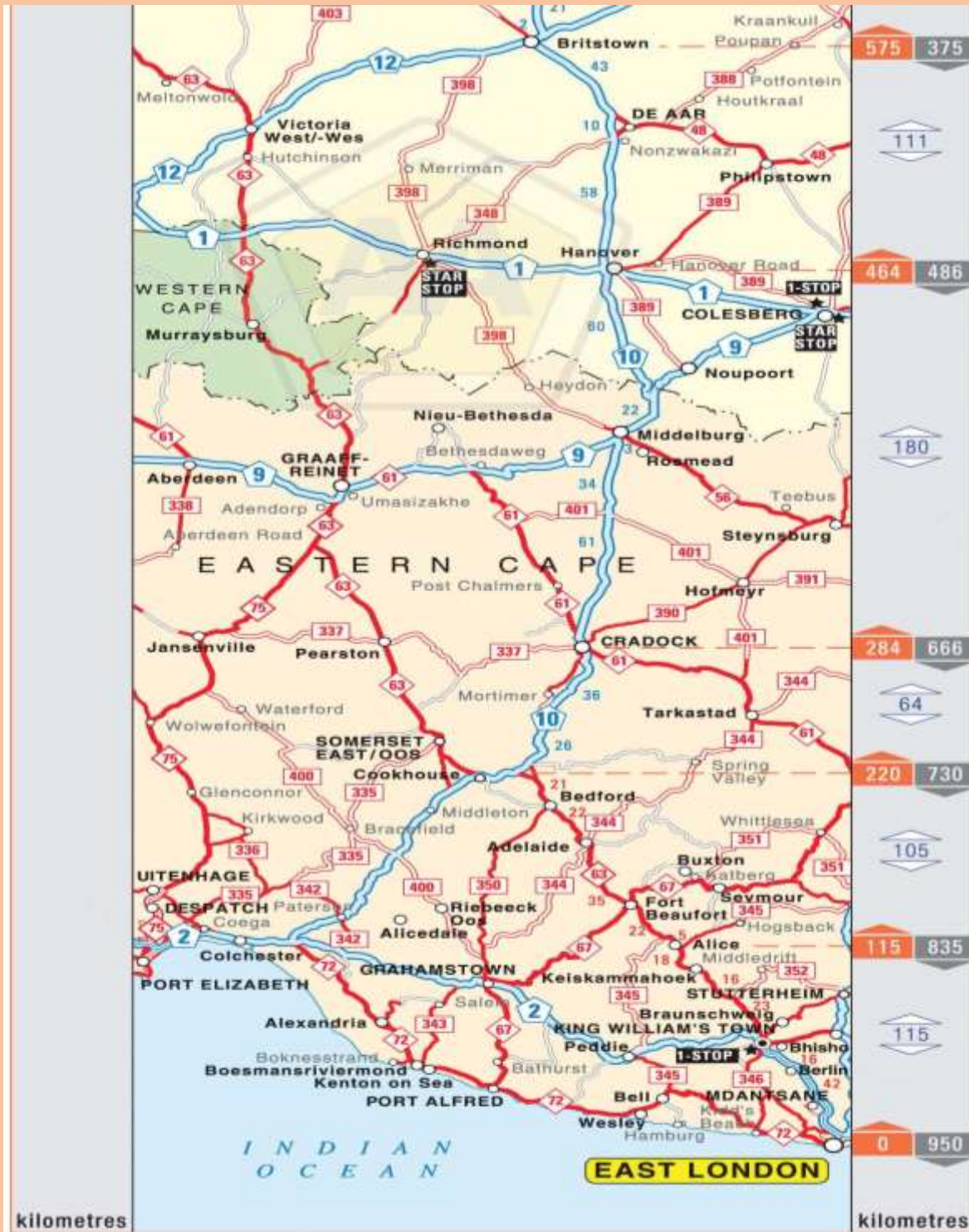
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE B – QUESTION 2			
			
National Road	Provincial Road	Local road	Provincial Boundry

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



**Question 3 [ 20 Minutes]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Patrick's Bakery delivers some of its products to Fournos Bakery at a local mall. The mall floor plan is shown on **ANNEXURE C**. Study the plan and answer questions that follow.

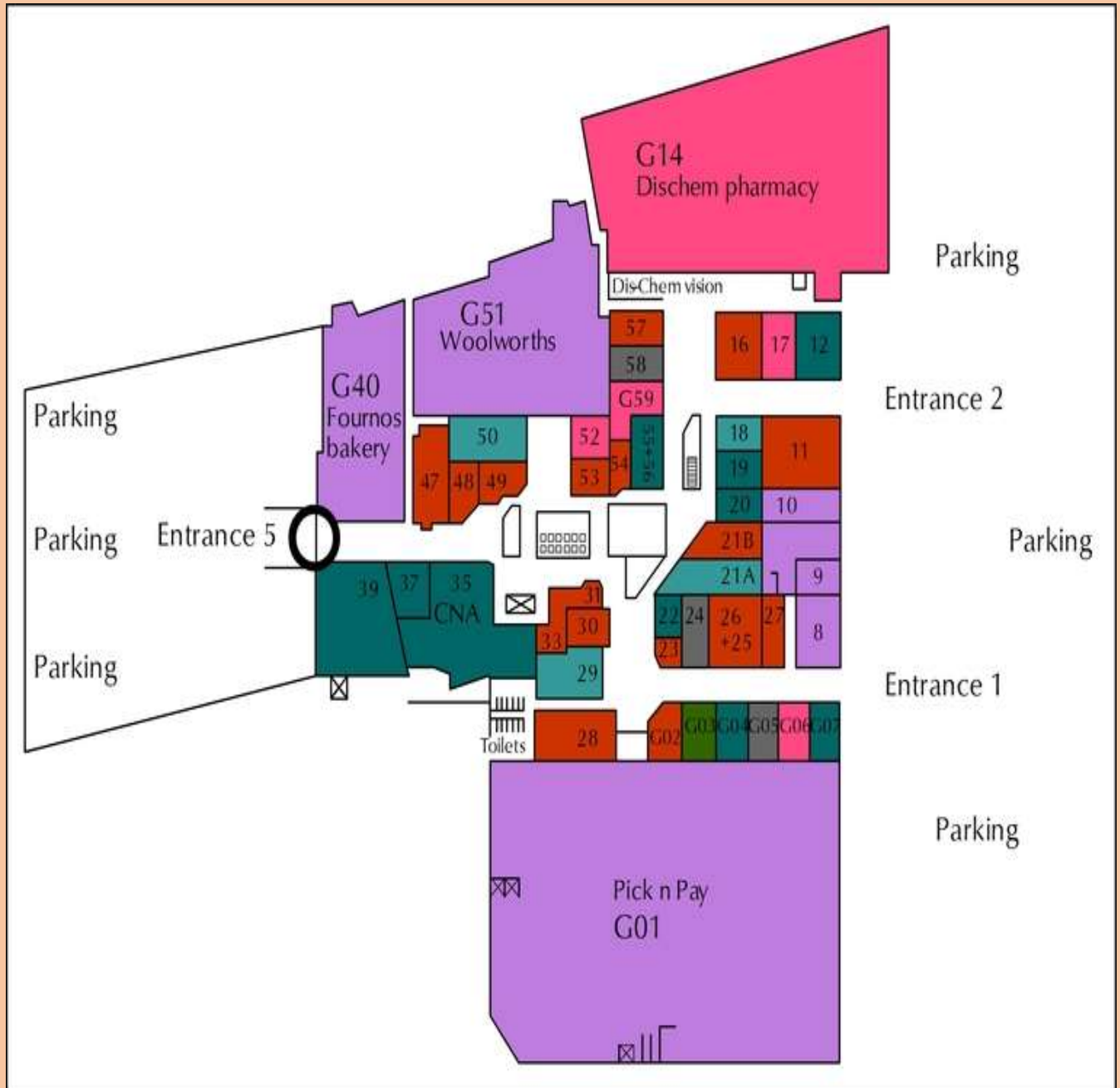
- 3.1 Name the entrance point situated on the west side of the mall. (2)
- 3.2 What is the name of shop G14? (2)
- 3.3 Choose the correct word: Fournos Bakery is situated **above/opposite** shop 39. (2)
- 3.4 One of Patrick's employees comes to the mall to deliver some bread to Fournos Bakery. Give him directions to the bakery if he enters through Entrance 1. Include compass directions in your explanations. (4)
- 3.5 Choose the correct word: If one enters this mall through entrance 2, the probability that the first shop on the right is shop 39 is **highly likely/impossible/certain** (2)

[12]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE C



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**EXTRA RESOURCE  
QUESTION 4**

Use the map provided in ANNEXURE D to answer the questions that follow.

- 4.1 Write down the grid reference for Durban. (2)
- 4.2 The distance from Ladysmith and Greytown is 124 km. (2)
- 4.2.1 Convert the distance to miles if 1 mile = 1,609 km. (2)
- 4.2.2 How many litres of fuel will be needed for a single trip between the two towns if the consumption rate of the vehicle is 6,4 litres per 100 km? (2)
- 4.3 Name the neighbouring country which can be found on the western side of Kwazulu-Natal. (2)
- 4.4 Give the general direction that Ulundi lies from Vryheid. (2)
- 4.5 Name the province in which Piet Retief town is situated and give the grid reference of the town. (2)
- 4.6 Give the names of at least four towns that you will pass if you travel from Dundee to Richards Bay, taking the most direct route. The names of the towns must be in the correct order as they appear on the map. (2)

**[16]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE D



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

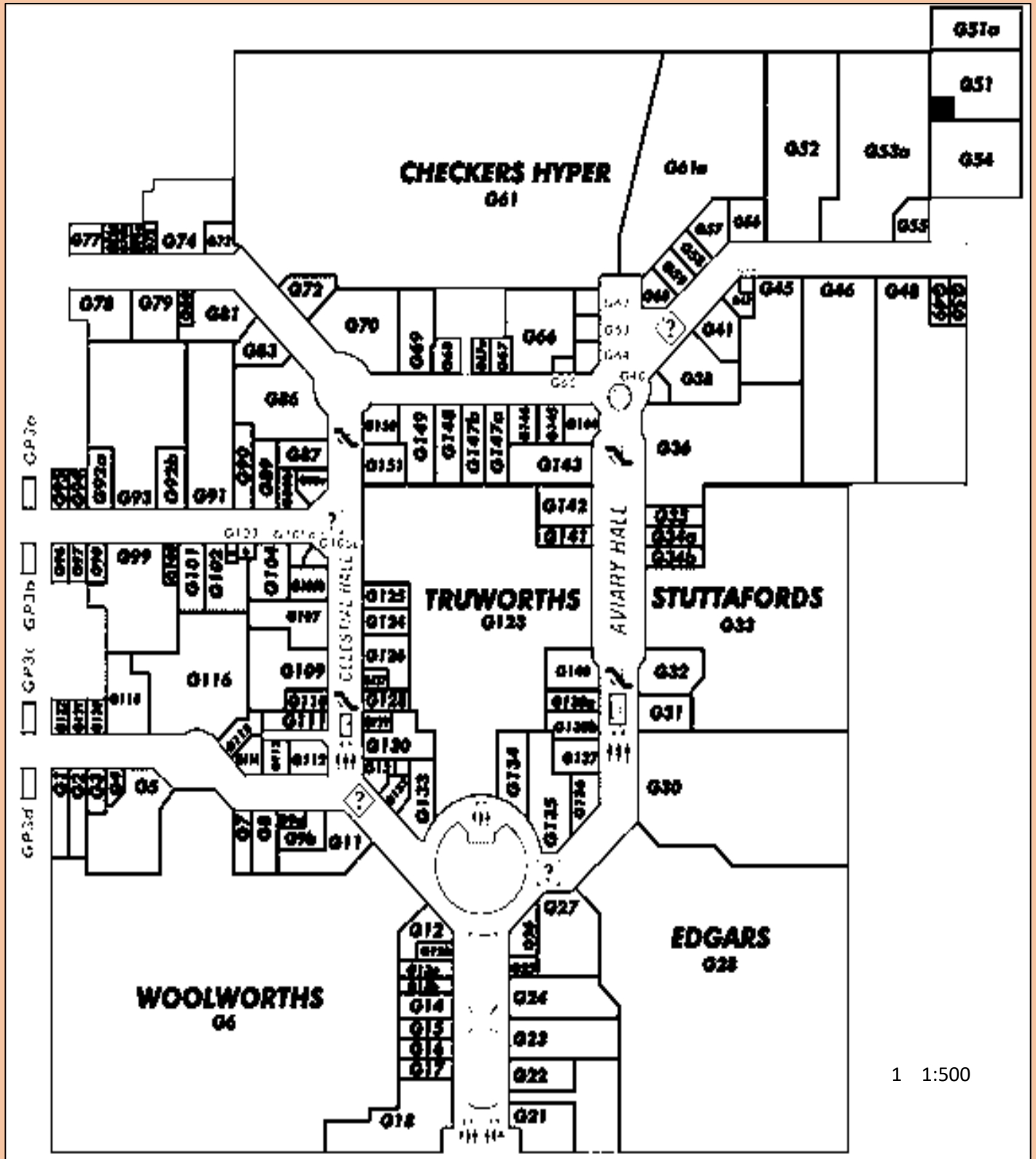
## QUESTION 5

- 5.1 Charles' son Peter is studying in the University of Pretoria he went to Menlynmall for shopping with his friend Benny. Use **ANNEXURE E**, a floor plan for the Ground floor of Menlyn mall. Study the plan and answer the questions that follow. (3)
- 5.1.1 Peter and Benny decide to meet each other for a shopping trip at Woolworths. Peter doesn't know where Woolworths is and phones you for directions. He is currently at the entrance to Checkers Hyper. Give him detailed directions to where Woolworths is (2)
- 5.1.2 How many restrooms are on the ground floor of Menlyn mall? (2)
- 5.1.3 Explain the meaning of the scale given on the plan. (3)
- 5.1.4 Use the scale to calculate the length of shop G46. (3)
- 5.2 Peter's uncle (Stevie) lives in Melmoth and is planning a trip to Durban. On **ANNEXURE F** is a road map of the North Coast. Study the map and answer the questions that follow.
- 5.2.1 Describe two routes Stevie can travel when traveling to Durban from Melmoth. (4)
- 5.2.2 Stevie decides to stop for lunch in Zinkwazi beach, determine what direction he will have to travel after lunch to reach Durban. (2)
- 5.2.3 Use the scale given to calculate the distance from where he stops for lunch to his destination (3)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

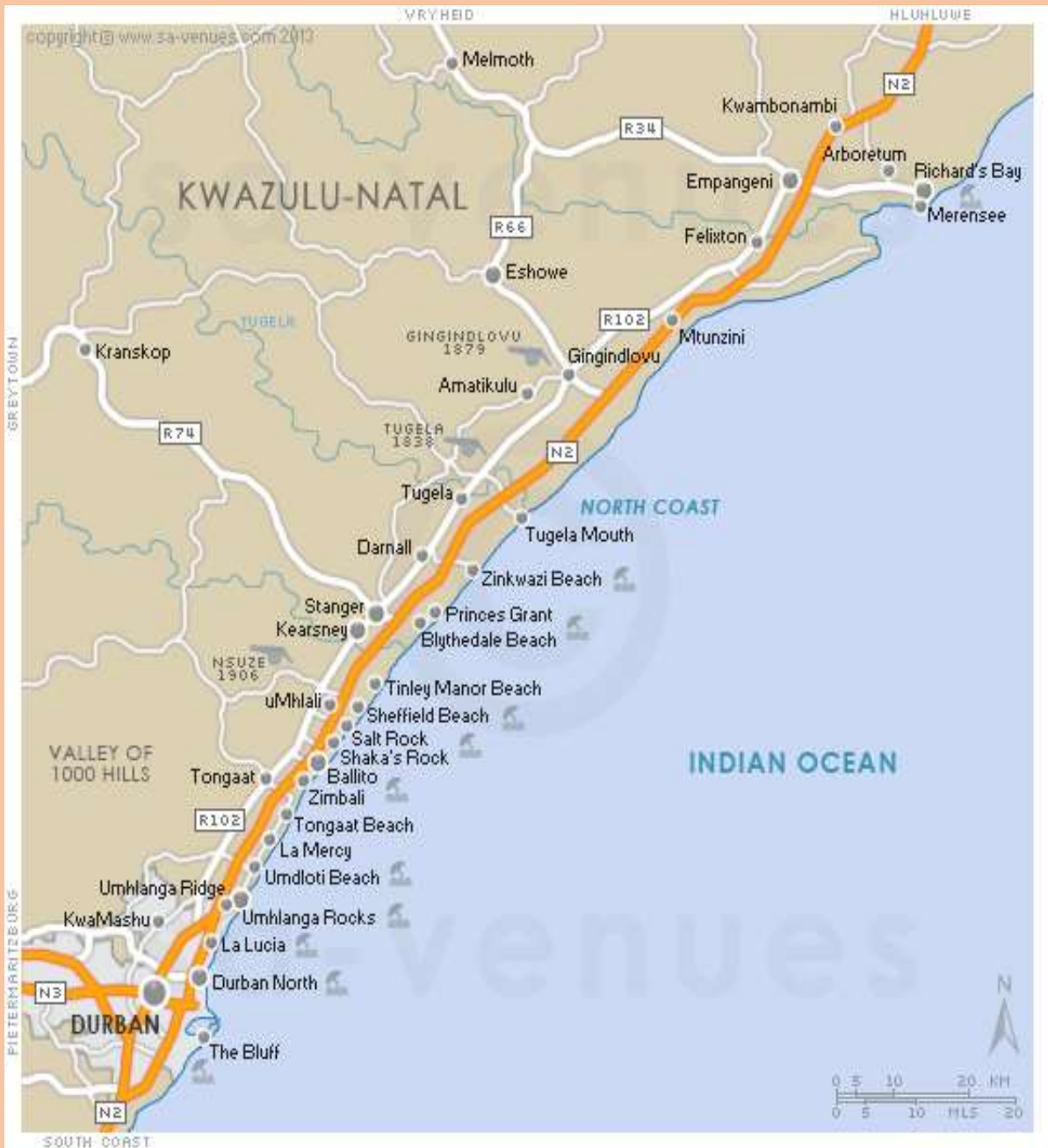
**ANNEXURE E**



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE F



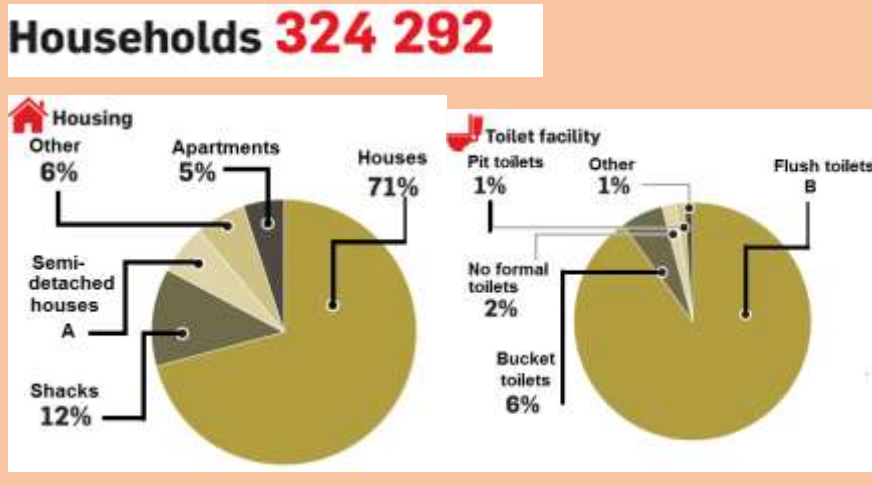
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**SESSION 4  
DATA HANDLING**

**QUESTION 1 [30 MINUTES]**

1.1 The pie charts below show a municipality's service deliver for a particular period.  
Study the pie charts below and answer the questions which follow:



1.1.1 Calculate the missing values of A and B. (4)

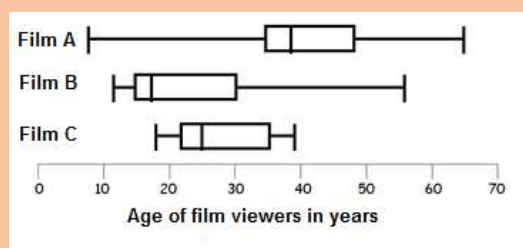
1.1.2 Determine the number of households using bucket toilets. (3)

1.1.3 Determine the number of shacks in the municipality. (3)

1.1.4 Is the data above an example of discrete or continuous data?  
Give a reason for your answer. (3)

1.1.5 Write the number of houses as a ratio to the number of apartments. (2)

1.2 The box-and-whisker plots below represent the age of people who viewed three different films.  
Study information below and answer the questions which follow:



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2.1 Write down the median age of a viewer who viewed Film A. (2)

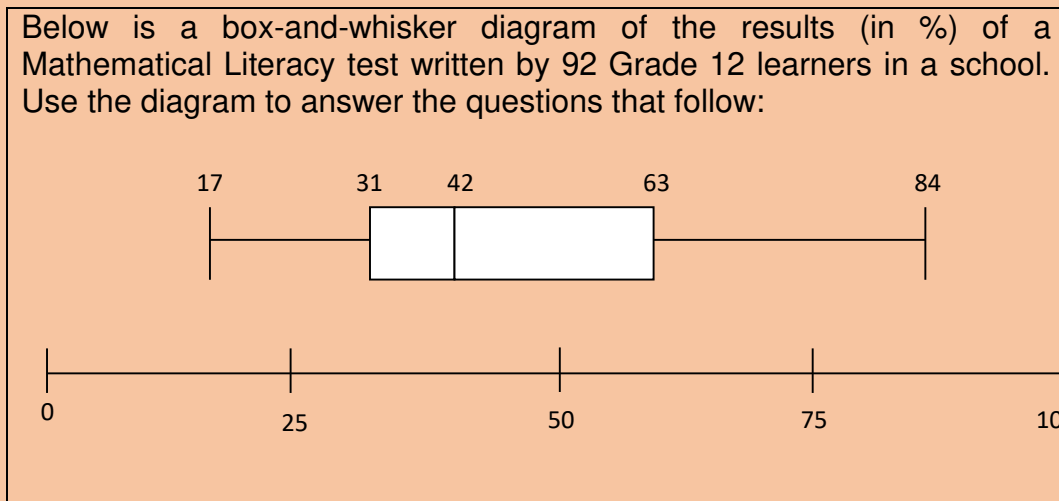
1.2.2 Determine the age of the youngest person who viewed Film B (2)

1.2.3 Which film was viewed by a 65 year old person? (2)

[21]

**QUESTION 2 [30 MINUTES]**

2.1 Below is a box-and-whisker diagram of the results (in %) of a Mathematical Literacy test written by 92 Grade 12 learners in a school. Use the diagram to answer the questions that follow:



2.1.1 What is the highest mark obtained? (2)

2.1.2 What percentage of learners obtained more than 42%? (2)

2.1.3 How many learners obtained more than 63%? (2)

2.1.4 Determine the inter-quartile range. (2)

2.1.5 How many learners obtained between 31% and 63%? (2)

2.2 A number of participants in a cycle race recorded their hours training as well as their 2014 results for the race in the following table:

Cyclist number	1	2	3	4	5	6	7	8	9
<b>Training time in hours</b>	20	18	16	17	19	13	12	9	15
<b>2012 results (minutes)</b>	20 3	28 5	24 5	25 6	23 0	29 7	21 0	31 0	25 5

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2.1 Display the information in a scatter plot. (2)

2.2.2 In the sample above, how many hours training did the cyclist who took the longest time to complete the race do? (2)

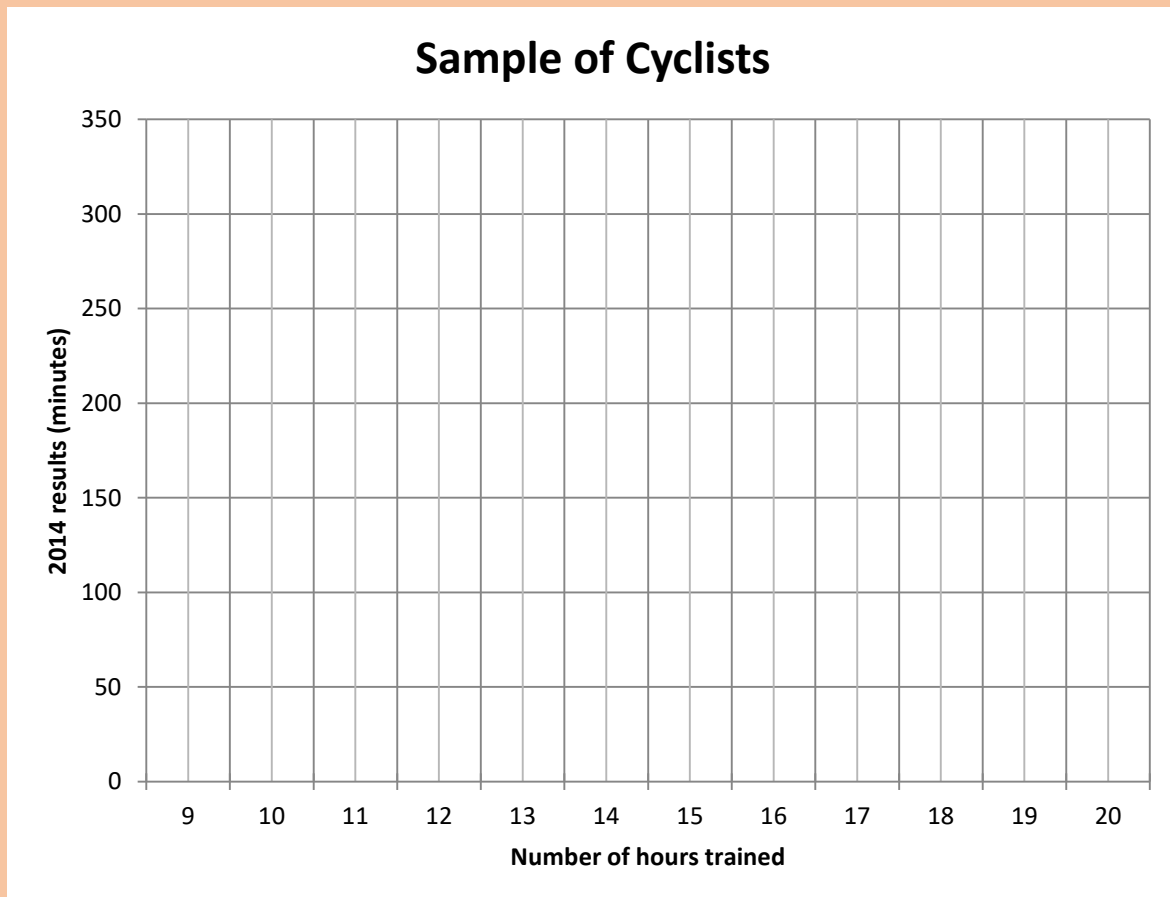
2.2.3 Which cyclist had the best results amongst the nine cyclists in the race? Explain your choice. (2)

2.2.4 Identify the type of correlation between the training hours and the time taken to complete the race. (2)

**[18]**

## ANSWER SHEET

### Question 2.2.1



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 3 [30 MINUTES]**

3.1 The table below shows information collected regarding a group of motor vehicle drivers who were interviewed about the number of car accidents they were involved in during the past year:

Number of accidents in the past year	Age and gender of driver						Row totals
	18 - 28		29 - 39		40 - 50		
	Male	Female	Male	Female	Male	Female	
0	124	146	135	154	159	153	871
1	52	43	43	28	28	35	229
2	24	11	22	18	13	12	100
<b>Column totals</b>	200	200	200	200	200	200	1 200

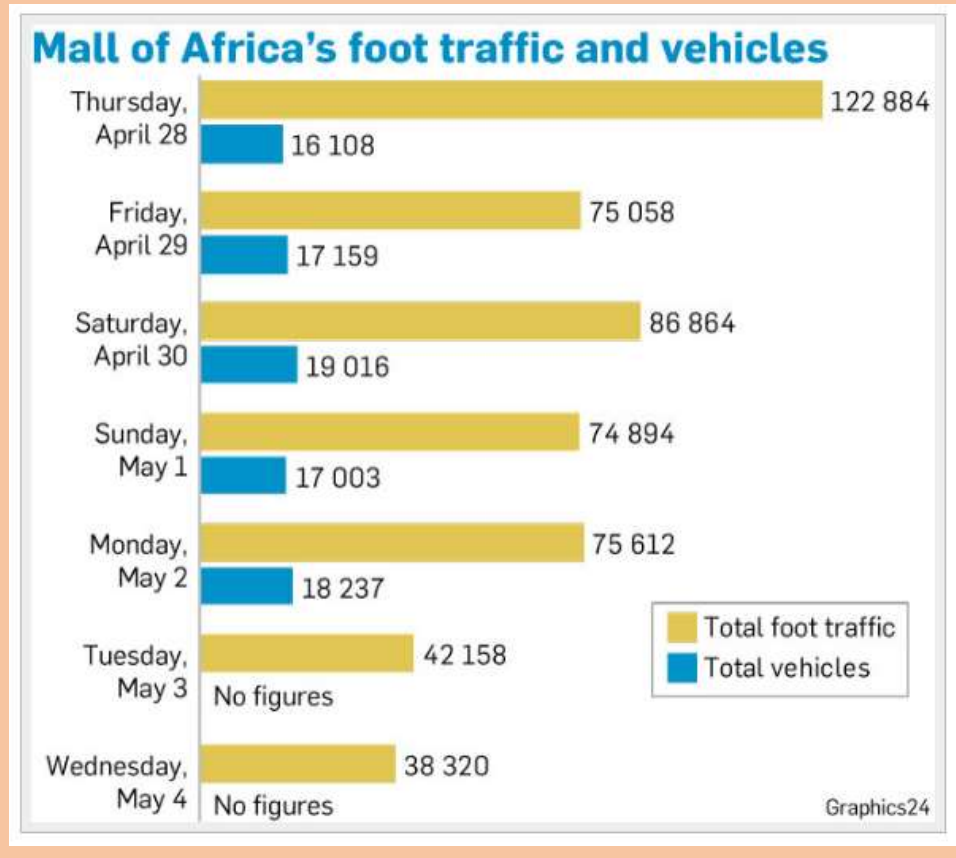
- 3.1.1 How many people were interviewed? (2)
- 3.1.2 How many of the people that were interviewed were males in the age group 18 – 28? (2)
- 3.1.3 How many of the people that were interviewed had been involved in two car accidents in the past year? (2)
- 3.1.4 If a motor vehicle driver is randomly selected from the interviewed group, what is the probability that the driver:  
(Give your answer as a percentages, rounded to one decimal) (2)
- (a) Had one motor accident in the past year? (2)
- (b) Is a male in the age group 18 - 28 and had one car accident in the past year? (2)
- (c) Is a male that had one motor accident in the past year? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.2

The following data was provided by Graphics 24 on traffic at Mall of Africa.



3.2.1 Name the type of graph being used above? (2)

3.2.2 According to the graph above, on which day were there the most vehicles? (2)

3.2.3 How many vehicles visited the Mall of Africa over the seven day period? (3)

3.2.4 Determine the number of foot traffic the mall had over the week-end? (2)

**[23]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## ADDITIONAL RESOURCES

### QUESTION 2

- 1.1 The sports organiser of Mzila secondary school conducted a survey on weight status of girls at school. He calculated the Body Mass Index (BMI) of a sample of girls' population at the school. There were 365 girls at the schools.  
The table below shows the age, mass and BMI of the sample.

**Table 1: The age, mass and height of surveyed learners**

Learner	Age (years)	Height (m)	Mass (kg)	BMI
Vuyo	14	1,65	65	23,9
Glynis	18	1,7	72	<b>P</b>
Doris	16	1,62	68	25,9
Yolanda	16	1,5	65	<b>Q</b>
Mpho	18	1,55	72	29,95
Tsakane	15	1,56	66	27,1
Refilwe	16	1,55	62	25,8
Norah	17	1,58	63	25,2
Siba	15	<b>R</b>	69	27
Noni	16	1,55	53	22,1
Yonela	17	1,66	81	29,4
Amanda	19	1,63	71	26,7

- 2.1 Answer the following questions.
- 2.1.1 Determine the range of ages of the girls in the sample.

(2)

- 2.1.2 Use the formula:  $BMI = \frac{Weight (kg)}{Height (m)^2}$  to calculate:

(3)

- (a) P

(2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

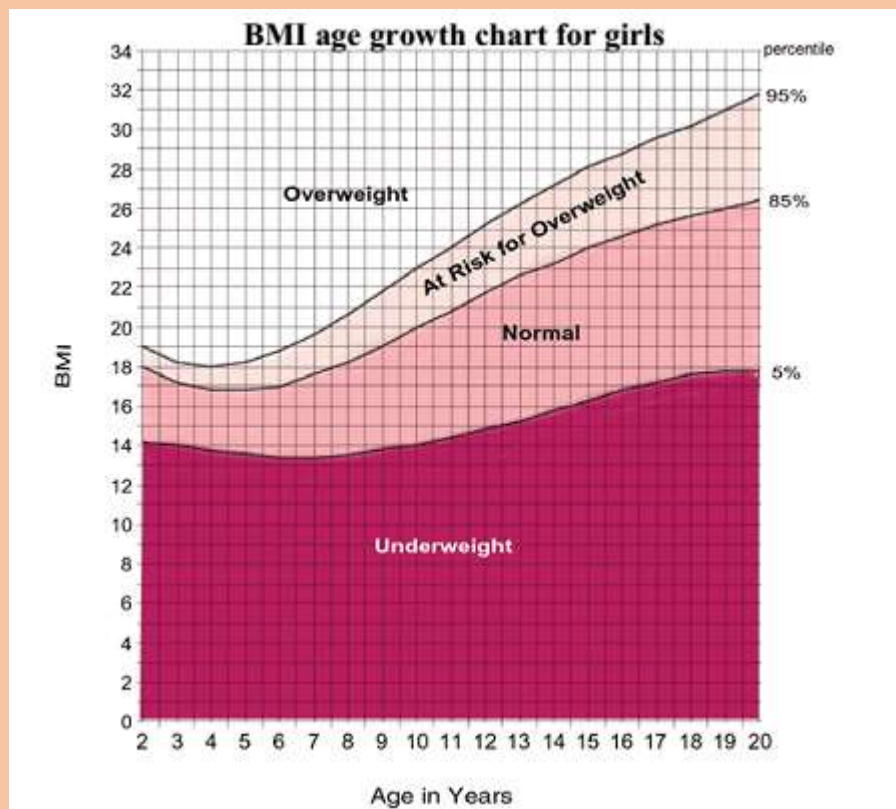
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- (b) Q (2)  
(c) R (3)

2.2

The BMI is used to determine the weight status of individuals. The sports organiser used the following BMI growth chart for girls to determine the weight status for this sample.

**Use Table 2 and the BMI age growth chart below to answer the following questions.**



- 2.2.1 Determine Tsakane's weight status. (2)  
2.2.2 Determine the number of 16 – year old girl(s) whose weight status lies between the 5<sup>th</sup> and 85<sup>th</sup> percentile. (2)  
2.2.3 What is the weight status of girl(s) in 2.2.2 above? (2)  
2.2.4 Amanda is worried about her weight status. She wants her status to be normal. (2)  
(a) What is Amanda's current weight status? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

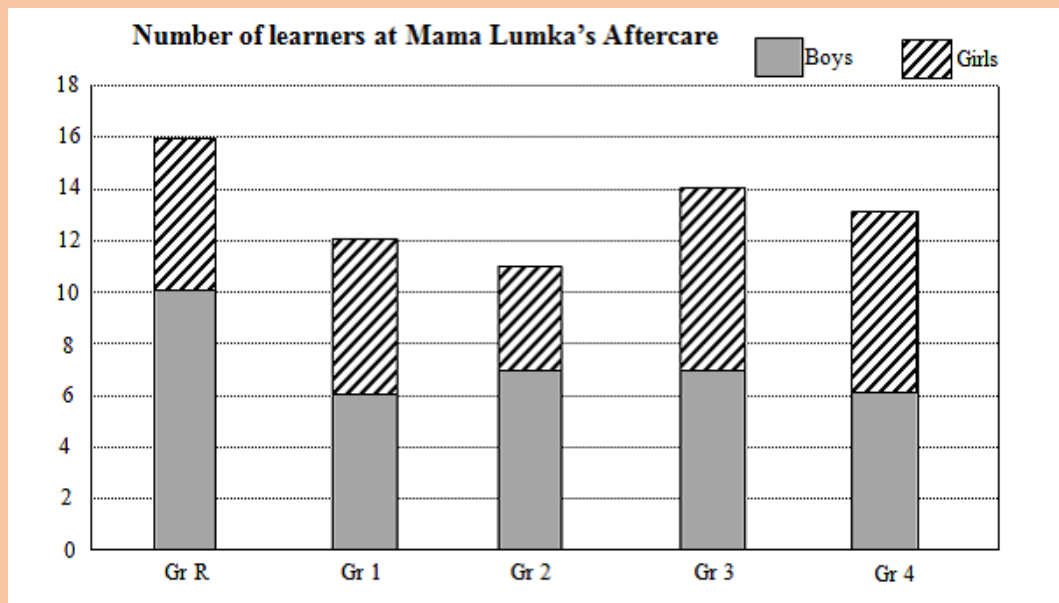
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- (b) Calculate the minimum number of kilograms Amanda must lose to get a normal weight status.

(4)  
[21]

### QUESTION 3

- 3.1 The composite bar graph below shows the number of learners in each grade at Mama Lumka's aftercare.



- 3.1.1 How many learners are there in grade 2 aftercare? (2)
- 3.1.2 How many more boys than girls are in grade R? (2)
- 3.1.3 What percentage of learners in Mama Lumka's is in grade 4? (4)
- 3.1.4 What is the average (mean) number of boys per grade? (3)
- 3.2 Tshawe uses seashells to make ornament as shown below. He then sells these to tourists near the beach. He measured the widths, in millimetres, of a few seashells and recorded the findings as follows:

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

11	8	11	13	10	9	7	14
12	13	12	8	7	9	10	12
13	12	13	14	12	10	10	9
15	12	11	10	12	14	11	12
10							










3.2.1 Determine the modal width of the shells. (2)

3.2.2 Calculate the range of the width of the shells. (2)

#### QUESTION 4 DATA HANDLING

4.1 ALL AFRICA GAMES took place in Maputo, Mozambique 3<sup>rd</sup> to 18<sup>th</sup> September 2011. The data in the table below shows the number of medals won by the top ten countries participating in these games.

Rank	Nation	Gold	Silver	Bronze	Total
1	 <u>South Africa</u> (RSA)	61	55	40	156
2	 <u>Egypt</u> (EGY)	32	14	20	66
3	 <u>Nigeria</u> (NGR)	31	28	39	98
4	 <u>Tunisia</u> (TUN)	29	26	13	68
5	 <u>Algeria</u> (ALG)	22	29	34	85
6	 <u>Kenya</u> (KEN)	14	14	22	50
7	 <u>Senegal</u> (SEN)	8	8	17	33
8	 <u>Cameroon</u> (CMR)	8	5	20	33
9	 <u>Ethiopia</u> (ETH)	6	10	12	28
10	 <u>Angola</u> (ANG)	6	10	10	26
	<b>Total</b>	<b>217</b>	<b>199</b>	<b>227</b>	<b>643</b>

4.1.1 For how many days was the ALL AFRICA GAMES held? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

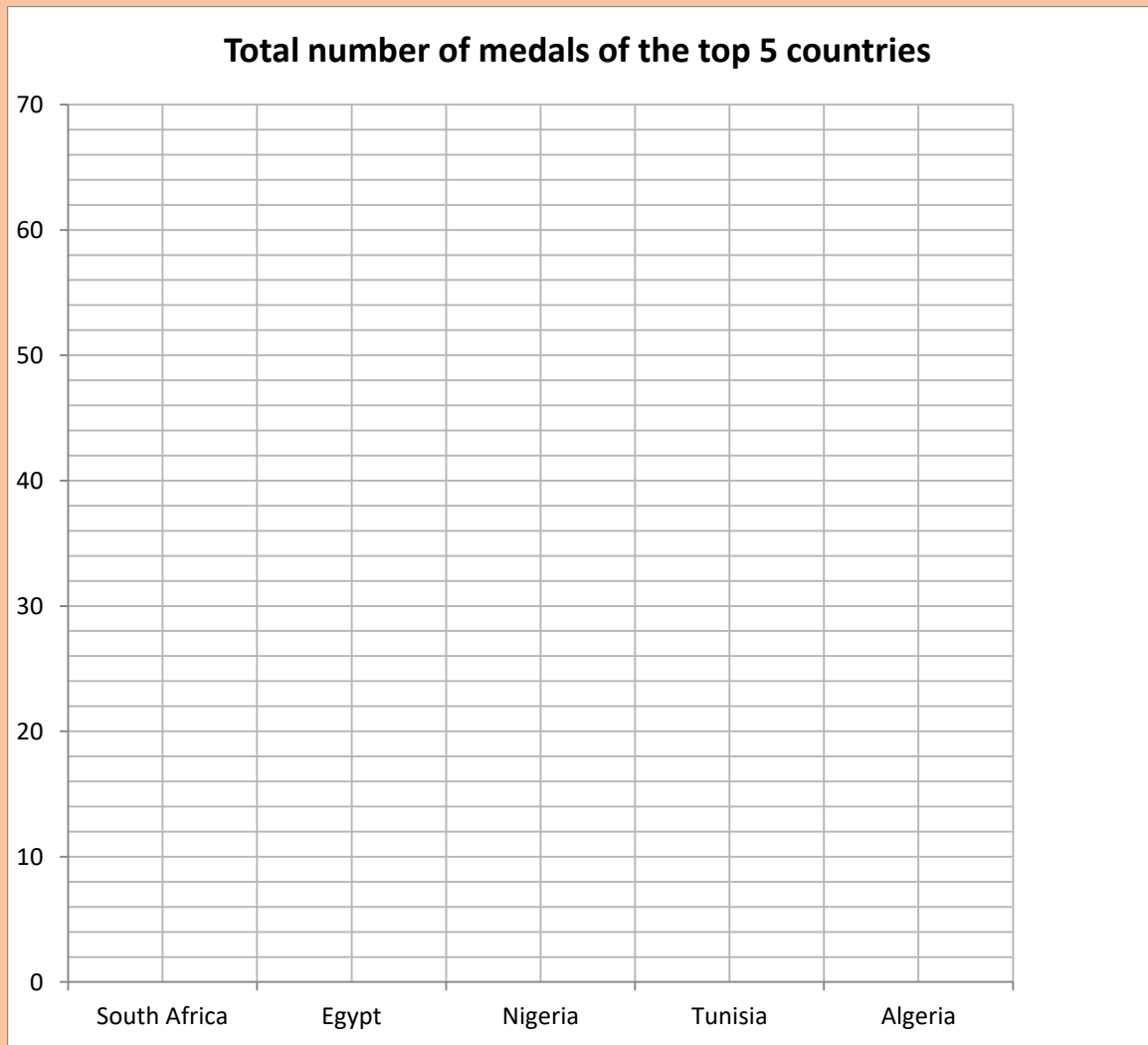
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 4.1.2 Calculate the range of the bronze medals awarded. (2)
- 4.2 For the gold medals determine the following:
- 4.2.1 Mean (2)
- 4.2.2 Median (2)
- 4.2.3 Mode (2)
- 4.3 Draw a compound bar graph showing the total medals of the top five countries on **ANNEXURE A**. (6)

#### ANNEXURE A

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**SESSION 5:  
FINANCE, MEASUREMENT AND DATA HANDLING**

**FINANCE**

**QUESTION 1(32 Minutes)**

Lennox has a small furniture manufacturing shop. He works 20 days in a month. He wants to install a few electrical wood working machines.

<b>Small power users 1 (High consumption &gt; 1000Kwh/ Month)</b>			
<b>Services rendered</b>	<b>Unit</b>	<b>2016/7 R excl. VAT</b>	<b>2016/7 R incl. VAT</b>
<b>Service charge</b>	<b>R/ day</b>	<b>20.67</b>	<b>23.56</b>
<b>Energy charge</b>	<b>c /Kwh</b>	<b>111,52</b>	<b>127,13</b>

- 1.1.1 He has determined that he will not use more than 1000Kwh per month. What will the service charge be per day exclusive of VAT. (2)
- 1.1.2 If he works for 5 days and uses 45Kwh per day . How much must he pay for the electricity used inclusive of VAT. (3)
- 1.1.3 What is the maximum number of Kwh that can be used per day if he does not want to exceed the 1000Kwh limit per month. (2)
- 1.1.4 Lennox has budgeted to spend a maximum of R6000 per month on electricity .Calculate how many Kwh can be used to fall within the allowed budget. (4)

1.2	Supreme Secondary School has just completed their budget and you have been asked to check the numbers to check that no errors have been made.			
	<b>Income</b>		<b>Expenses</b>	
	All revenues from all sources	R1 237 980	Total expenses	R1 202 980
	Surplus for the year	R35 000		

- 1.2.1 Show with calculations; that the surplus is R35 000. (2)
- 1.2.2 Determine how much money is needed per day to run this school for the year. (2)
- 1.2.3 What is the surplus per day in the income statement? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

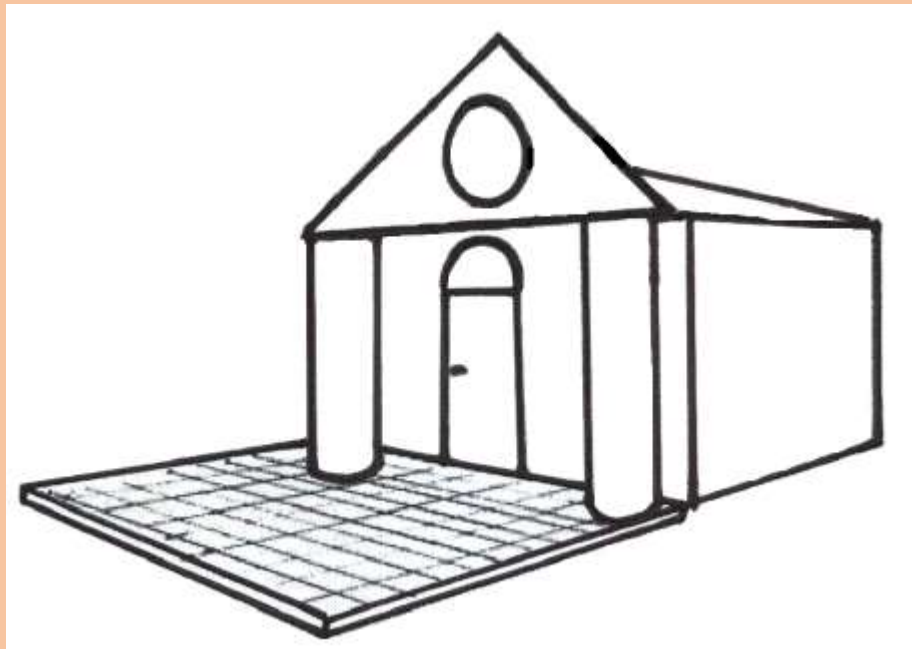
- 1.2.4 If the revenue of the school increased by 10% for the next financial year and the expenses increased by 13 % .Would the school still end the year with a surplus on their books. (7)

[22]

### MEASUREMENT(36 Minutes)

#### QUESTION 2

Thumi and Martha are newlyweds. They bought a house and decided to change the front view of the house. ATP Builders has been contracted to do the necessary improvements. Here is an architect's sketch. (The sketch is not drawn according to scale.)



The triangular roof rests on two cylindrical shaped concrete pillars. There is a semi-circular bullet proof glass window above wooden front door and another circle shaped glass window in the roof. The stoep at the entrance must also be tiled.

- 2.1 Concrete is made by mixing cement, sand and gravel. ATP Builders use the following guidelines to determine how much cement is needed to build the two concrete pillars.

<b>MEDIUM STRENGTH CONCRETE</b>	
<b>Water guide: 32,5 ℓ per one bag of cement</b>	
<b>Amount of concrete needed in m<sup>3</sup></b>	<b>Full bags of cement</b>

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1	8
2	16

- 2.1.1 Calculate the volume of concrete (in  $\text{m}^3$ , to two decimal places) needed to cast one pillar if the pillar is 350 cm high and the radius of the pillar is 0,45 m.

Use the formula: **Volume =  $\pi \times (\text{radius})^2 \times \text{height}$**   
where  $\pi = 3,14$

(4)

- 2.1.2 How much concrete is needed to cast two cylindrical shaped pillars?

(2)

- 2.1.3 Suppose  $6\text{m}^3$  concrete is needed to cast two pillars. How much water must be added to the cement? Give the answer in kilolitres.

(4)

- 2.2 GP Glass Works are sub contracted by ATP Builders to cut the windows according the correct specifications.

One window is in the shape of a semi-circle (with radius 75 cm) and the other window is a full circle (with radius 75 cm).

- 2.2.1 Calculate the area of glass (in  $\text{m}^2$ ) that is used for both windows (the circle and the semi-circle).

Use the formula: **Area of a circle =  $\pi \times (\text{radius})^2$**  ,  
where  $\pi = 3,14$ .

(5)

- 2.2.2 Calculate the cost, in rand, to install the windows (in 3.2.1) at 7c per  $\text{cm}^2$ . [1  $\text{m}^2 = 10\,000\text{ cm}^2$ ]

(4)

- 2.3 Thumi and Martha decide on imported tiles for the stoep. The measurements per tile is one foot by one foot.

- 2.3.1 Calculate the area of one tile in square metres. (1 foot = 0,3 m)

Use the formula: **Area of square = length  $\times$  length**

(2)

- 2.3.2 Calculate the number of tiles that must be imported in order for the stoep with measurements of 7 m by 4 m, to be tiled. Order 30 extra tiles in case of breakage.

(4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Use the formula: **Area of rectangle = length × width**

[25]

**DATA HANDLING(22 Minutes)**

**QUESTION 3**

- 3.1 The following table shows weather prediction for Ladysmith from Tuesday 31 March 2015 to Saturday 04 April 2015 during Easter week. Study the table below and answer the questions that follow.

**Temperature for five days**

<b>Temperature</b>	<b>Mon</b>	<b>Wed</b>	<b>Thurs</b>	<b>Fri</b>	<b>Sat</b>
Minimum Temperature in °C	16	17	16	15	17
Maximum Temperature in °C	27	25	30	29	28

Source: Accu Weather SA

3.1.1 Determine:

- a) The median of the minimum temperatures (2)
- b) The range of the maximum temperatures. (2)

3.1.2

- a) Calculate the mean of the maximum temperatures (3)
- b) Determine the mode of the minimum temperature (2)

3.2 Consider the following statements:

- A: The value that shows the mid-value for a set of given data.
- B: The sum of the data divided by the number of data items.
- C: The difference between the Quartile 3 and Quartile 1.
- D: The difference between the highest and the lowest value in a set of Data.
- E: The item that occurs most in a set of data.

State which ONE of the above statements BEST describes each of the following:

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.2.1 Interquartile range (2)

3.2.2 Mode (2)

3.2.3 Median (2)

[15]

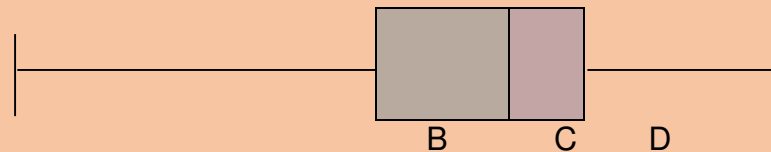
## ADDITIONAL RESOURCES

### QUESTION 2

2.1

The majority of Metro High Schools' learners who committed violent incidents were Grade 9 boys. The arranged ages of these Grade 9 boys and a corresponding box-and-whisker plot are given below.

<b>A</b>	14	14	14	14	15	15	15
15	15	16	16	16	16	16	16
16	16	16	16	17	17	17	17
17	17	17	17	17	17	17	17
17	18	18	18	18	18	18	18



2.1.1 Determine the missing value **A** if the range of the ages of the Grade 9 boys who committed violent is 5 years. (2)

2.1.2 Calculate the mean age of the Grade 9 boys who committed violent incidents. (3)

2.1.3 Calculate the missing quartile values B, C and D of the box-and-whisker plot (5)

2.1.4 A Grade 9 boy who committed a violent act is randomly selected. Determine the probability (expressed in decimal form) that the boy would be 16 years or older. (3)

[13]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 3

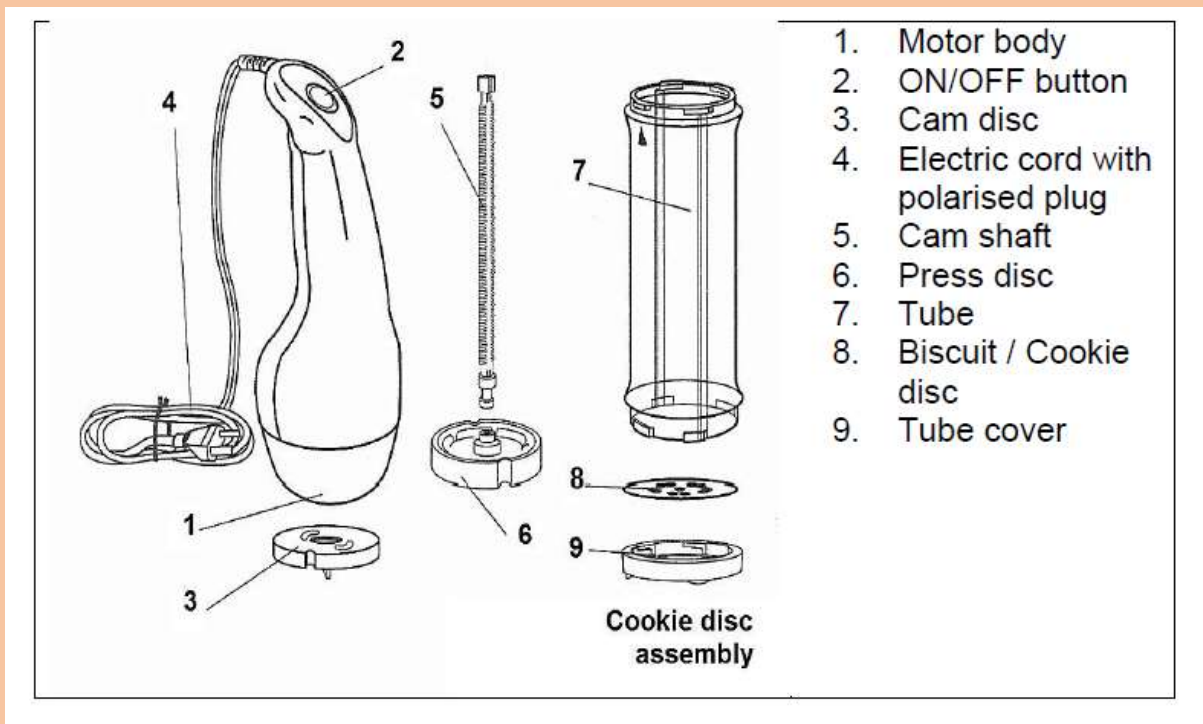
Mrs Letswalo, the educator at Lethabong Secondary school is assisting the grade 12 learners to raise funds towards their Matric dance. She then engaged some learners in the business of baking and selling of biscuits and cookies. To make their task easier, she decided to buy an electrical biscuit and cookie maker as shown in the diagram below.



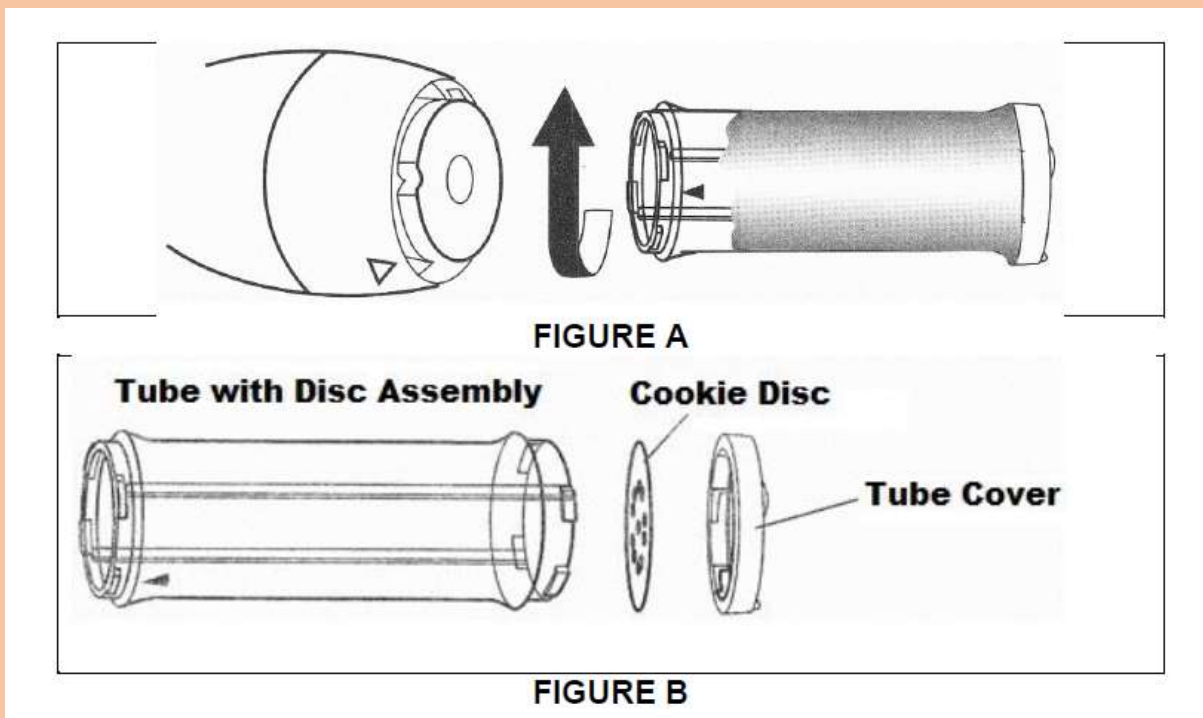
In order for them to use the biscuit and cookie maker, they have to read through all the instructions to assemble it. The following shows illustrations of the different parts of the biscuit and cookie maker.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

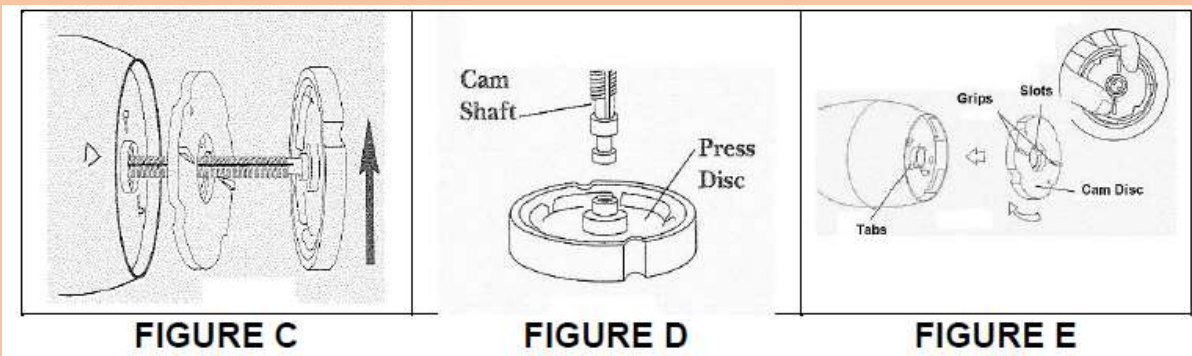


The following pictured instructions were included in the box. The pictures are not necessarily in the correct order for assembly.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



3.1.1	Read through the following chronological instructions. Choose the correct figure that best matches each of the instructions below.	
	1 Attach Cam Shaft to the Press Disc by inserting the stem of the Shaft into the Press Disc's centre hole. Press firmly. You will hear a click as the Shaft snaps in place.	
	2 Line the Tabs on the Motor Body up with the slots on the Cam Disc. Insert the Cam Disc into the Motor Body. Using the two Grips on Disc, turn slightly clockwise until the Disc clicks into position.	
	3 Fit the Shaft all the way inside the unit, until the outside contours of the 2 Discs line up.	
	4 Select a disc and place it inside the Tube cover. Then place the Tube into the Tube Cover, turning clockwise until locked.	

5 With a spoon or spatula, load the freshly prepared dough into the top of the Tube.

6 Look inside the Tube to see the ridges extending from top to bottom. These ridges align with the outside contours of the 2 Discs. Grasp Tube firmly, join the Body with the filled Tube and turn clockwise until the Tube locks into position. (6)

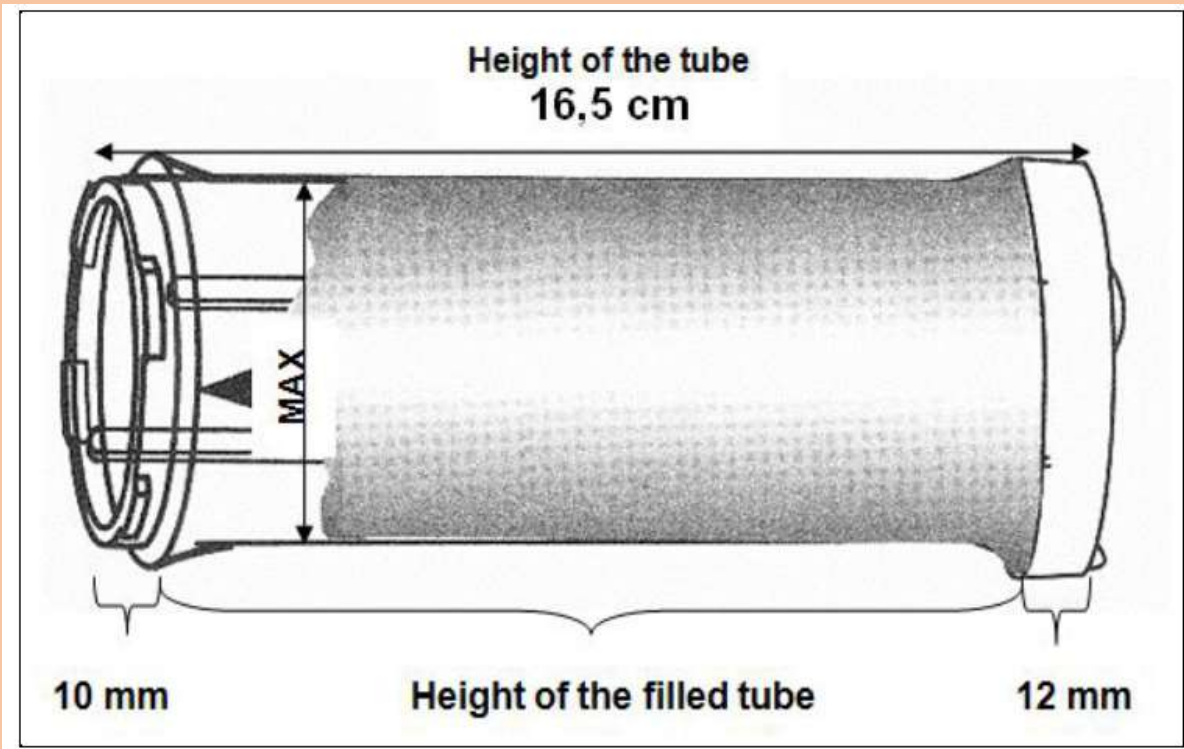
3.1.2. The introduction to the instructions is that you always have to unplug the biscuit and cookie maker from the outlet before assembly or disassembly of parts. (2)

Why do you think this is an important instruction?

3.2 The following diagram shows the tube that needs to be filled with prepared dough. (Diagram not drawn to scale.)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

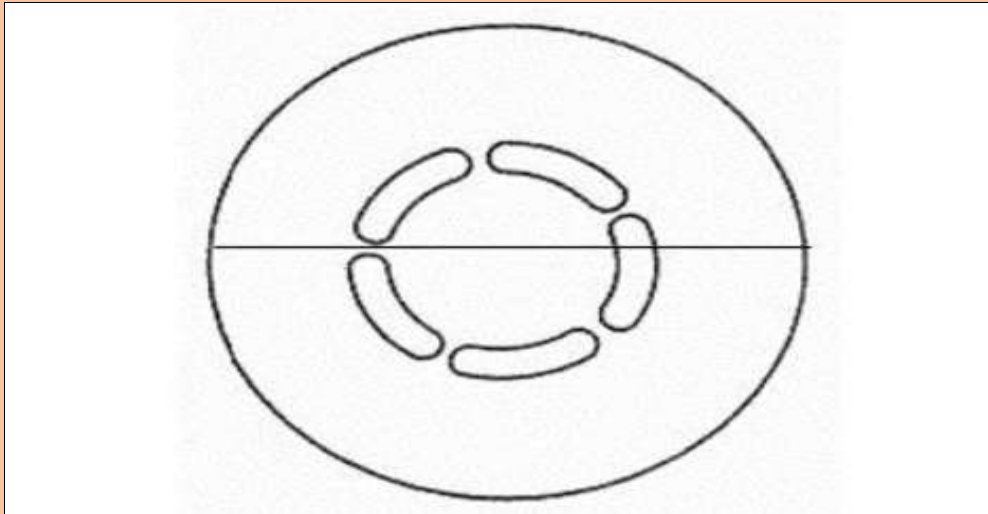


- 3.2.1 Determine the height of the filled tube. (3)
- 3.2.2 On the tube there is an indication that the filling must not pass the MAX, fill line. If the height of the filling in the tube must be 76,9% of the height of the filled tube, calculate the height of the tube that must not be filled. Give your answer to 1 decimal place. (4)
- 3.2.3 If the height of ONE unbaked cookie is 5 mm, how many cookies can Mrs Letswalo press from ONE filled tube? (4)
- 3.3 The unbaked cookie has a circumference of 17,9094 cm. The following diagram is only a representation that is not drawn to scale. (4)

--	--	--

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



The following formulae should be used:

**Area =  $\pi r^2$**

**Circumference =  $2\pi r$**

**Use  $\pi$  as 3,142**

- 3.3.1 Show with necessary calculations that the radius of the unbaked cookie is 2,85 cm. (4)
- 3.3.2 Calculate the area of the unbaked cookie. (3)
- [30]

#### QUESTION 4

In order to save electricity she decided to use the gas stoves. They fill the cylindrical bottles at the local dealer.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## MEASUREMENTS PAPER 2 QUESTIONS

A hospital in South Africa has a helipad that is used for emergency helicopter landings, as shown in the picture alongside.

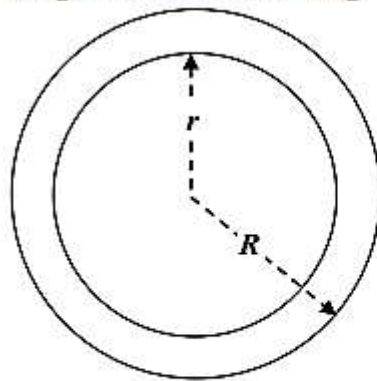
**Picture of a helicopter landing on a helipad**



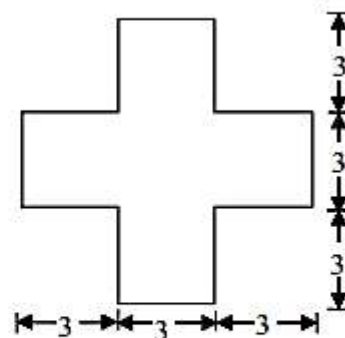
The maintenance manager uses the following layout plan to determine the quantity of paint required to re-paint the white circular ring and the white rectangular cross.

### LAYOUT PLAN OF THE AREA THAT NEEDS TO BE RE-PAINTED

**Diagram of the white ring**



**Dimensions (in m) of the white cross**



The two circles forming the ring have the same centre. The radius ( $r$ ) of the inner circle is 7,34 m and the radius ( $R$ ) of the outer circle is 7,65 m.

The following formulae may be used:

**Area of ring** =  $\pi \times (R^2 - r^2)$ , using  $\pi = 3,142$

**Area of square** = **side**  $\times$  **side**

**Area of rectangle** = **length**  $\times$  **breadth**

The manager obtained the following information from a local paint supplier:

- The white paint is only available in 5 litre tins.
- A 5 l tin of paint cost R675 (excluding VAT).
- One litre of paint covers an area of  $8 \text{ m}^2$ .
- This paint can be applied to any surface.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 1.1 Determine (to the nearest  $m^2$ ) the total surface area that needs to be repainted. (8)
- 1.2 The manager claims that the total cost (including VAT) of the paint would be NOT more than R2 500,00 (if TWO coats of paint are applied). Verify if his claim is correct. (7)
- 1.3 The manager noticed that the cylindrical tins of paint are placed in rectangular crates for delivery to the store. The tins form a rectangular pattern when placed on the base of the crate.

**Net of the surface area of the crate with inside measurements in mm**

370  
450  
370  
450

450 740 450

**3-dimensional sketch of a rectangular crate**

**5 litre paint tin**

The dimensions of the tin are as follows:  
radius = 91,5 mm  
height = 222 mm

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



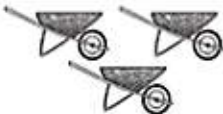

Determine the maximum number of tins of paint that can be packed in ONE crate. (4)

1.4

The manager also has to erect a wire fence around a section of the helipad.

- The wire fence is attached to poles that are cemented into the ground.
- These poles are planted in square-based rectangular holes to a depth of 610 mm in the ground.
- A concrete mix is used to secure these poles in the ground.
- The ratio of the number of bags of cement to the number of wheelbarrows of coarse sand and stone is shown below.

**Ratio for the concrete mix**

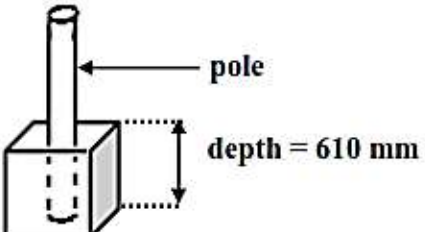
High strength cement	Coarse sand	Stone	Approximate yield
			
2 Bags (1 = 50 kg)	3 Wheelbarrows	3 Wheelbarrows	0,3 m <sup>3</sup>

[Source: [www.afrisam.co.za](http://www.afrisam.co.za)]

The following formula may be used:

**Volume = (side)<sup>2</sup> × depth**

**Sketch of pole cemented in the hole**



1.4.1 Calculate the length of the side (in mm) of the hole, if the volume of soil removed to make the hole is 0,1525 m<sup>3</sup> (4)

1.4.2 The manager decided to buy 10 bags of cement to mix the concrete to fill the holes. Each pole occupies a volume of 0,03 m<sup>3</sup> in the prepared hole. Verify, with calculations, whether he bought enough bags of cement to secure the 12 fencing poles in the 12 holes. (6)

1.4.3 The fish pond below is in the foyer of the primary school. The radius of the outer circle is 2 m and the diameter of the inner circle is 3 m. The dimensions of the square part of the fish pond are 1,2 m x 1,2 m

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



Use the formulas below to calculate the area around the square fish pond, excluding the outer ring:

**Area circle =  $\pi \times r^2$**       Use  **$\pi = 3,142$**

**Area square =  $s^2$**  (5)

## QUESTION 2

A cylindrical barrel (drum) contains 42 gallons of oil. The diameter of this barrel is 18 inches.

**You may use the following information**

1 gallon = 3, 78541 litres

1 inch = 2, 54 cm

1 ml = 1 cm<sup>3</sup>

**PICTURE OF A BARREL/DRUM**

**Volume** =  $\pi \times r^2 \times h$ , let  $\pi = 3,142$

**Surface area** of cylinder with a closed lid and base  
=  $(2 \times \pi \times r^2) + (2 \times \pi \times r \times h)$



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

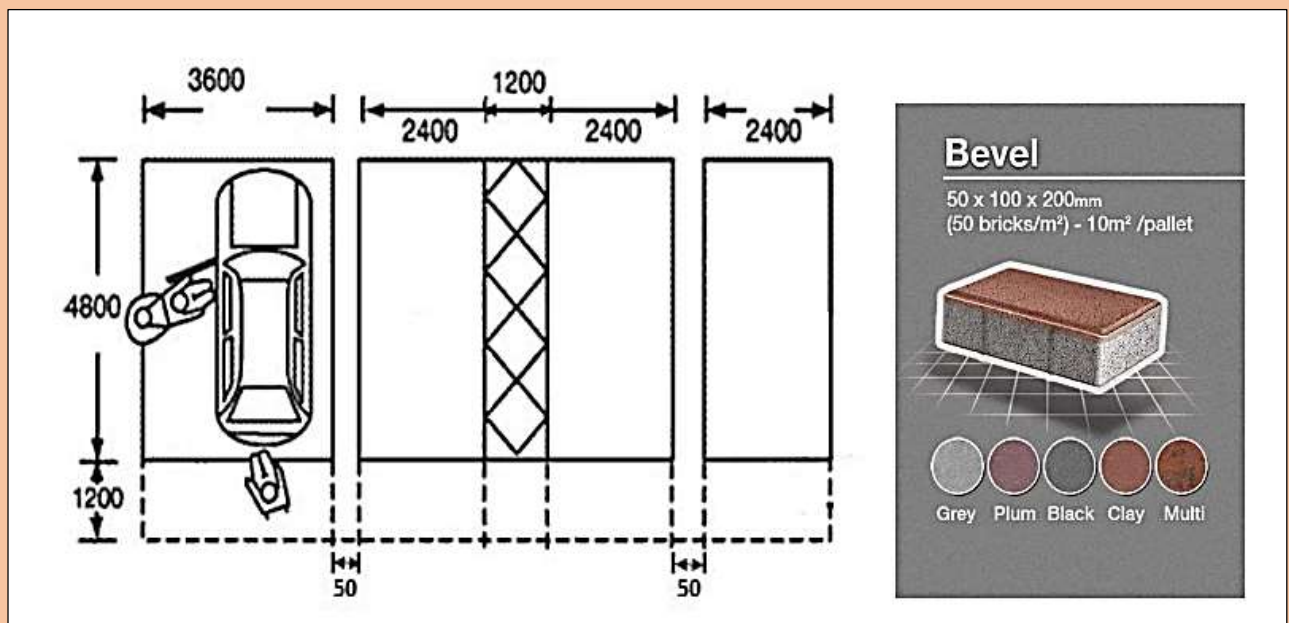
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 2.1 Determine the radius of a barrel (drum) in centimetres. (3)
- 2.2 Show, by calculations, that the height of the barrel of oil is 96,82 cm. (5)
- 2.3 Calculate the surface area of this barrel in  $\text{m}^2$  (5)
- 2.4 The diagram below shows a parking area of a local clinic in Bloekombos near Cape Town. The clinic wants to pave the area using paving bricks. The type of paving bricks they want to use is shown alongside the parking area diagram.

The following information can be used:

- The dimensions of a paving brick is:  $50 \times 100 \times 200$  mm
- All the dimensions on the diagram are in mm.

Use the given information to answer the following questions.



- 2.4.1 Give a reason for the width of the first parking bay to be wider than the other three parking bays. (2)
- 2.4.2 Calculate the total area that needs paving in  $\text{m}^2$  (4)
- 2.4.3 Calculate the number of paving bricks per pallet if a pallet covers  $10 \text{ m}^2$  (3)
- 2.4.4 Determine the number of pallets required to pave the parking area. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 3

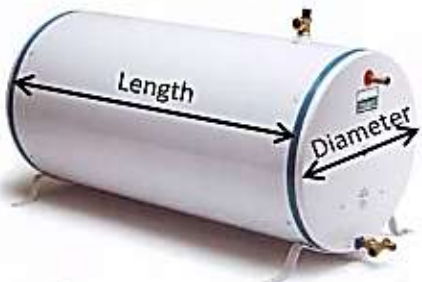
Mr Pillay realises that he will now need a bigger geyser to accommodate his bigger family. They previously had a geyser with a capacity of 100 l and now have a geyser with a capacity of 200 l.

The following statistics accompany the new geyser.

MODEL	ELECTRIC LOADING	OPERATIONAL PRESSURE	DIAMETER × LENGTH
50 Lt	2 kW	100 kPa or 200 kPa	450 × 610 mm
100 Lt	2 kW	100 kPa, 200 kPa or 400 kPa	550 × 840 mm
150 Lt	3 kW	100 kPa, 200 kPa or 400 kPa	550 × 1150 mm
200 Lt	3 kW	100 kPa, 200 kPa or 400 kPa	550 × 1470 mm
250 Lt	4 kW	100 kPa or 200 kPa	550 × 1875 mm

Unfortunately, the new geyser has led to a few arguments between Mr and Mrs Pillay. Mr Pillay is convinced that because the new geyser has twice the volume of the old geyser, the actual surface area of the new geyser will also be double that of the old.

3.1 With the use of the formula below, show whether Mr Pillay is correct.



$$\text{Surface Area} = (2 \times \pi \times r \times l) + (\pi \times r^2 \times 2)$$

Where  $r$  = radius  
 $l$  = length  
 $\pi = 3,14$

(8)

3.2 Mr Pillay is now confused. He decides to calculate the volume of each geyser to make sure he is not being deceived.

$\text{Volume} = \pi \times \text{radius}^2 \times \text{height}$

**OLD 100 l GEYSER:**

$$\begin{aligned} &\pi \times (550 \text{ mm})^2 \times 840 \text{ mm} \\ &= 798\,278\,693,3 \text{ mm}^3 \\ &= 798\,278\,69,33 \text{ cm}^3 \\ &\approx 79\,828 \text{ l} \end{aligned}$$

$$\begin{aligned} 1\,000 \text{ cm}^3 &= 1 \text{ litre} \\ \pi &= 3,14 \end{aligned}$$

Mr Pillay has made **two** errors whilst calculating the volume of the old 100 l geyser.

List the two errors and correct them. (4)

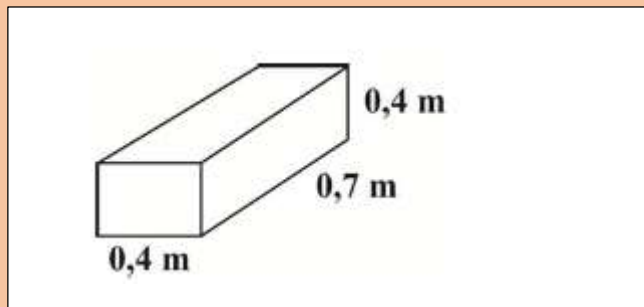
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 3.3 Calculate the volume of the new 200 l geyser to the nearest litre. (4)  
3.4 Based on the volume, should Mr Pillay be happy with his new geyser? Give a reason for your answer. (2)

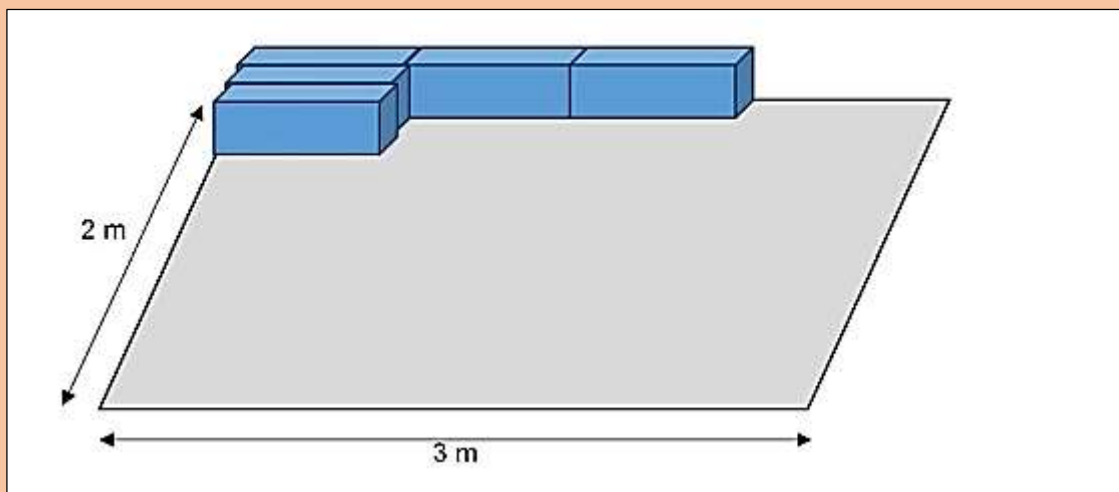
#### QUESTION 4

The owner of a house decides to use a part of the garage as a storage area for boxes. The storage boxes have the following dimensions.  
Diagram of box:



Each of the boxes has similar dimensions (0,4 m × 0,7 m × 0,4 m) occupying a rectangular area of the garage with dimensions 3 m × 2 m as shown by the sketches below:

Diagram of storage area with some of the boxes (diagram not drawn to scale):



- 4.1 Determine the maximum number of boxes that will fit within the length and width of the designated area. (2)  
4.2 If the owner stacks 2 boxes on top of each other, calculate how many storage boxes will fit in the designated area. (2)  
4.3 The owner is looking at five different designs of tiles, which she likes equally. She numbers the tiles and then writes the numbers on a piece of paper and throws the

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pieces of paper into a bag. She then randomly draws a number from the bag to help her decide from the list of the 5 tile designs below:

- a) beige tile with brown speckles
- b) plain white tile
- c) beige tile with brown stripes
- d) plain brown tile
- e) black tile with white spots

4.3.1 Determine the probability that the owner randomly chooses a tile that has the colour brown in it. (2)

4.3.2 Calculate the probability of her picking a tile containing either two colours or a tile with only one colour. (3)

### QUESTION 5

Basketball is one of the world's most popular and fastest growing team sports. Information about the court, scoring positions etc. are given in the following picture.

**Basketball courts and scoring positions**

**SLAM DUNK**  
Angle wrist over the ball and slam it down through hoop for two points

**BALL**  
24.8cm  
Weight 650g

**THE COURT**  
The key  
Free throw line  
Three point line  
28m  
15m

**Scoring positions:**  
3 pts Scores from outside 3pt line  
2 pts Score from inside the 3pt line  
1 pt Score from free throw line

**Teams:** 5 players  
**Referees:** 1 referee, 2 assistants  
**Duration:** 4 x 10mins followed as many periods as necessary to break a tie

**Player attire:** Vest, Long shorts, High-top basketball boots

**Hoop:** 45cm  
**Hoop height from court:** 3.05m

**Note :** pt means point and pts means points

*Source: [http://en.wikipedia.org/wiki/Basketball\\_court](http://en.wikipedia.org/wiki/Basketball_court)*

The following formulae are given to you and may be used if necessary

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Area of a rectangle = length  $\times$  breadth

Area of a circle =  $\pi \times (\text{radius})^2$   $\pi = 3,142$

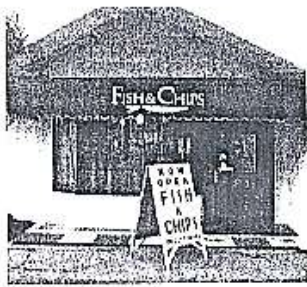
Perimeter of a circle =  $\pi \times \text{diameter}$

- 5.1 The maximum area the ball takes up when going through a hoop, is equal to that of a circle. Determine how much bigger the hoop is than the basketball (7).
- 5.2 Calculate the perimeter in meter of the standard basketball court's centre circle if the diameter is 12 foot  
Note 1 m = 3, 28084 feet
- 5.3 The areas under the posts are known as restricted areas. The inside of the restricted area must be painted. Calculate the total area that must be painted if the dimensions of one of the areas are 4,9m by 5,8m (3)

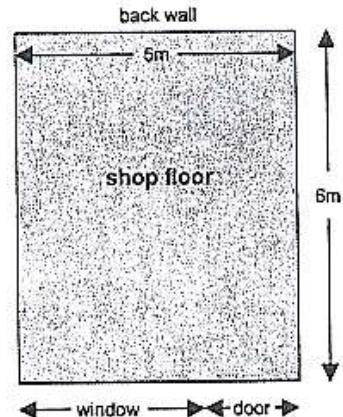
### QUESTION 6

The available shop is 6 m by 5 m and the height of the walls is 2,5 m.  
The front of the shop consists of a window and a door.  
She wants to paint only the sides and the back wall and then tile the floor.  
A picture of the shop and a diagram of the floor plan of the shop are given below:

**Picture of the shop**



**Floor plan of the shop**



The following formula may be used:  
**Area = length  $\times$  breadth**

- 6.1 Calculate the area of the floor of the shop. (2)
- 6.2 Calculate the area of the wall that have to be painted. Show ALL your calculations. (6)
- 6.3 Anile decides to cover the walls with TWO coats. The paint she uses is sold in 5 litre tins only and one litre of paint covers  $9\text{m}^2$ . Calculate the number of 5 litre tins of paint she needs to buy. (5)

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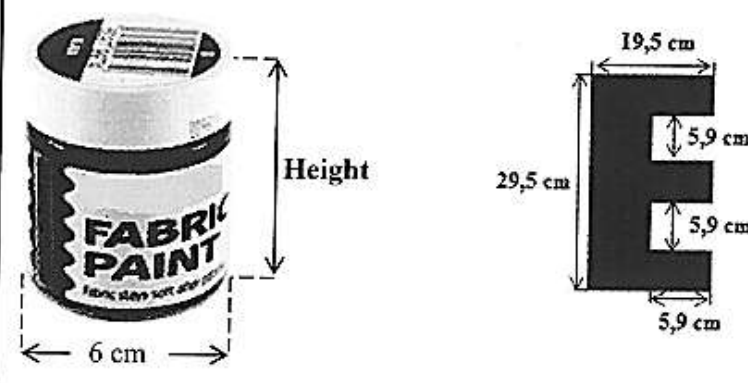
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### QUESTION 7

Some students painted one letter of the slogan #FeesMustFall on their T-shirts.

The letter E was painted on each T-shirt using fabric paint.

The spread rate of this particular fabric paint is 100 mℓ per 1 m<sup>2</sup> of fabric.



The diagram shows a cylindrical container of fabric paint on the left. The diameter of the base is labeled as 6 cm. The height is indicated by a vertical double-headed arrow labeled 'Height'. The container is labeled 'FABRIC PAINT' and 'FABRIC STAYS SOFT AND FLEXIBLE'. To the right of the container is a large letter 'E' with its dimensions: the top horizontal bar is 19,5 cm wide, the vertical stem is 29,5 cm high, and the two horizontal bars at the bottom are each 5,9 cm high and 5,9 cm wide.

- 7.1 Calculate the height (in mm) of the fabric paint container if the volume of the container is 367,38 cm<sup>3</sup>  
You may use the following formula:  
Volume of fabric paint container =  $\pi \times \text{radius} \times \text{radius} \times \text{height}$ , where  $\pi = 3,142$  (5)  
Calculate the amount of fabric paint required to paint the letter E on four T-shirts.  
(7)
- 7.2 The student used braiding (edging) to place a broader around the edges of the letter E. calculate the length of braiding(edging) needed to place a boarder around the edge of the letter e on one T-shirt (3)

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**Question 8**



**CONTEXT: THE COST OF RENOVATING THE CLASS**

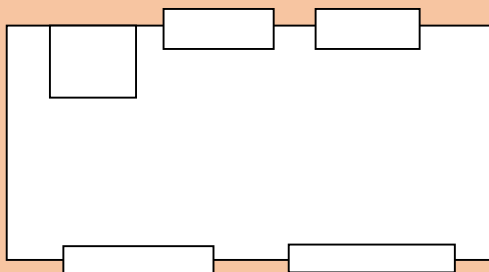
**INVESTIGATING THE COST OF RENOVATING THE CLASS ROOM**

The Grade 12 class of Busana Secondary decided to repaint their class room earlier this year because of high vandalism of the school premises. The learners held a school concert to raise funds.

The classroom they wanted to paint is 14 m long, 10 m wide and 3 m high.

The learners decide to paint the bottom half of each wall in brown gloss paint, and the top half of each wall in white PVA.

**The floor plan of the classroom is given below**

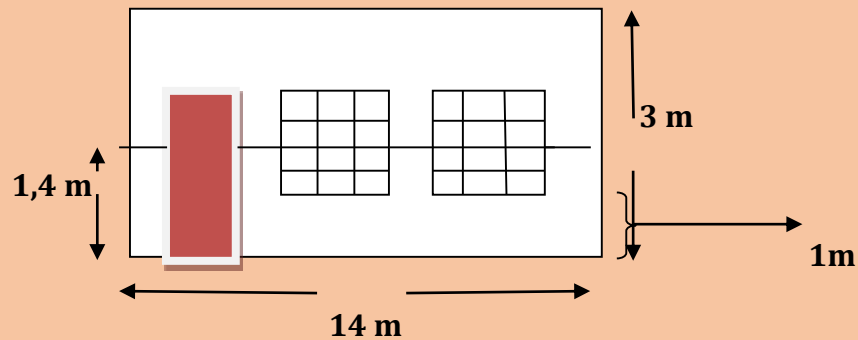


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The northern wall of the class-room contains the two windows and the door. The door is 2500 mm high and 800 mm wide. Each of the two windows is 1 200 mm high and 900 mm wide.

### Northern Wall



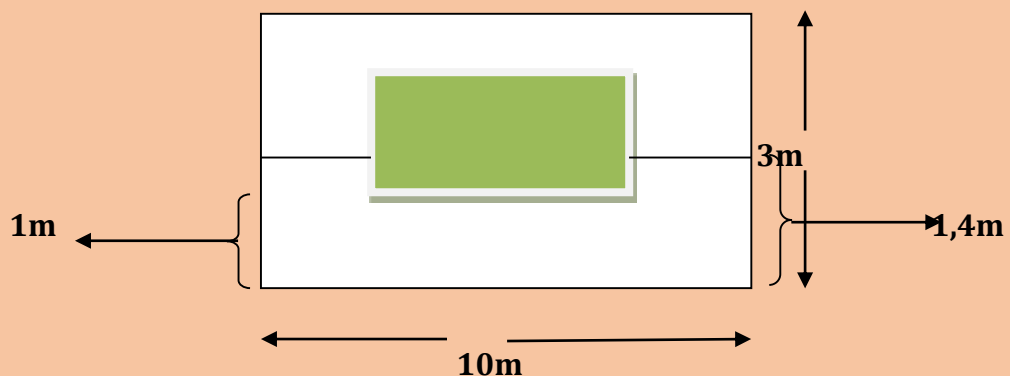
The distance from the floor to the window is 1 m

8.1 Calculate the area of the Northern wall that need to be painted with

- Brown gloss pain. (8)
- White PVA/Wit PVA. (8)

The Chalkboard is 1 m high and 4 m wide. It is 1 m from the floor. It is going to be painted with chalkboard paint.

### Western Wall



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

8.2 Calculate the area of the Western wall that to be painted with

- a) Brown gloss paint. (6)
- b) White PVA. (5)

8.3 Now calculate the total area of the class room to be painted with

- a) Brown gloss paint if the area of South wall is  $18,8 \text{ m}^2$  and of the Eastern Wall is  $14 \text{ m}^2$ . (4)
- b) White PVA if the area of South wall is  $21,4 \text{ m}^2$  and of the Eastern Wall is  $10 \text{ m}^2$ . (4)

8.4 One litre of brown gloss paint covers  $9 \text{ m}^2$ , one litre of PVA covers  $7 \text{ m}^2$ , and one litre of chalkboard paint covers  $4 \text{ m}^2$ .

Calculate:

- a) The number of litres of chalkboard paint that has to be bought. (1)
- b) The number of litres of brown gloss paint that has to be bought. (2)
- c) The number of litres of white PVA that has to be bought. (2)

8.5 The learners are intending to buy four mohair rollers and four paint trays.

Use the following prices to calculate the total cost of painting the classroom, remembering that the learners want to keep costs as low as possible.

**.PAINT PRICES**

Brown gloss paint                      5L                      R339,00                      1L                      R142,00

Cream white PVA	5L	R270,00	1L	R142,00
Chalkboard paint	5L	R320,00	1L	R129,00
Mohair rollers	R50,00			

Paint tray                      R19,00

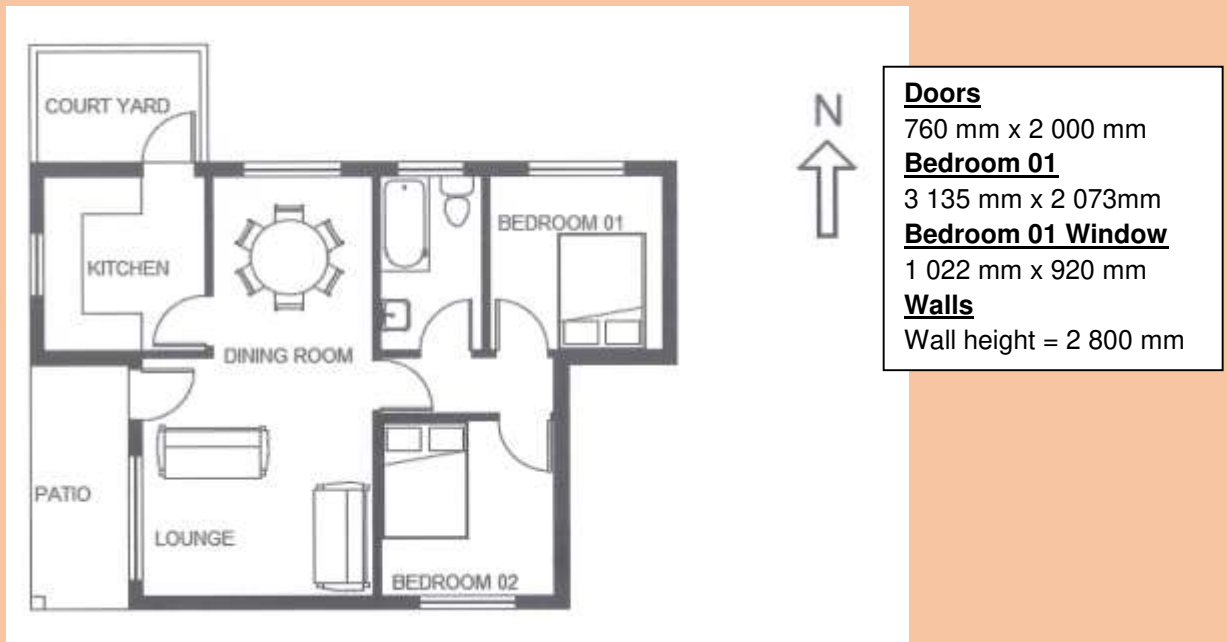
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### QUESTION 9

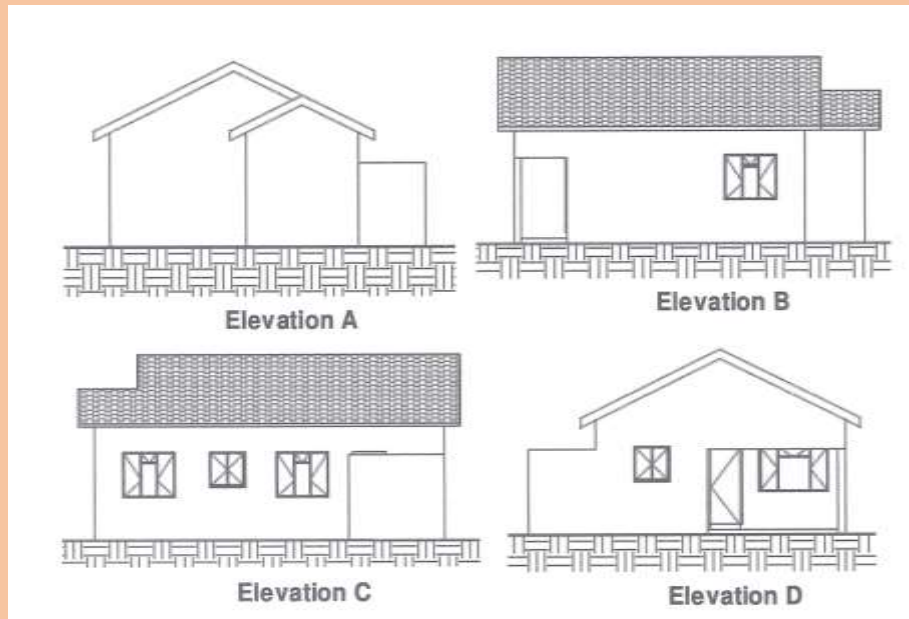
#### **BUILDING A HOUSE**

William and Sara are a newly married couple. They are planning to have a new house built. They received the following floor plan and elevation plan for a prospective house from their hired architect. Study the plans and answer the following questions.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- 9.1 Do the doors to the bedrooms open inwards or outwards? (2)
- 9.2 In which direction does the exterior door in the kitchen face? (2)
- 9.3 If weather conditions have been considered for the drawing of these plans, from which direction does the prevailing winds and rain come? Give a reason for your answer. (2)
- 9.4 Four elevation plans are given. Which elevation is the:
- 9.4.1 Southern elevation, (2)
- 9.4.2 Eastern elevation? (2)
- 9.5 Sara wants to decorate Bedroom 01 by laying wall-to-wall carpets and painting the walls lime green.
- 9.5.1 Determine the area, in metres square, of the floor in Bedroom01. (4)
- 9.5.2 Determine the area, in metres square, of the window and door in Bedroom 01. (3)
- 9.5.3 Determine the area of the walls to be painted in Bedroom 01. (4)

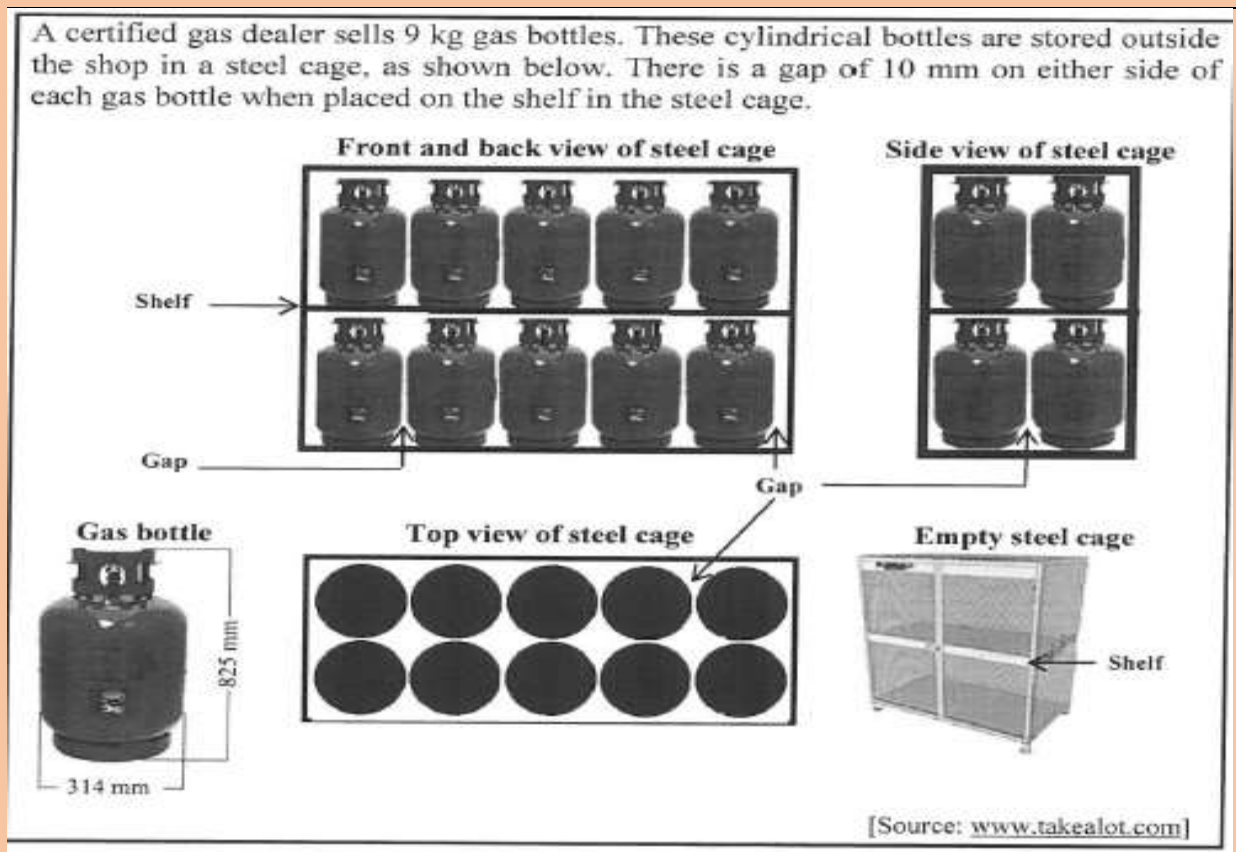
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2.5.4 The local hardware store supplied Sara with the following information:

- Wall-to-wall carpet = R 175 per square metre
- 5 litres PVA lime green paint = R 179
- 1 litre of paint covers  $16 \text{ m}^2$ . Sara will apply two coats of paint.

How much will it cost Sara to decorate Bedroom 01? (7)



4.1	Calculate the maximum number of gas bottles that can fit into one steel cage.	(2)
4.2	A company sells rectangular metal sheets with the dimensions 3.4 m by 2.1 m.	(8)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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	Determine, showing all calculations, the maximum number of shelves for the steel cage that could be cut from One metal sheet.	
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# Exemplars

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

#### **INSTRUCTIONS AND INFORMATION**

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Use the ANNEXURES to answer the following questions:  
ANNEXURE A for QUESTION 1.1  
ANNEXURE B for QUESTION 2.1  
ANNEXURE C for QUESTION 2.2  
ANNEXURE D for QUESTION 3.1
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL the calculations clearly.
7. Round off ALL final answers appropriately to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### QUESTION 1

1.1

The Pietermaritzburg Agency for Community Social Action (PACSA) has released its food barometer for January 2017, showing how food prices in the nutritional basket have changed over the past 12 months.

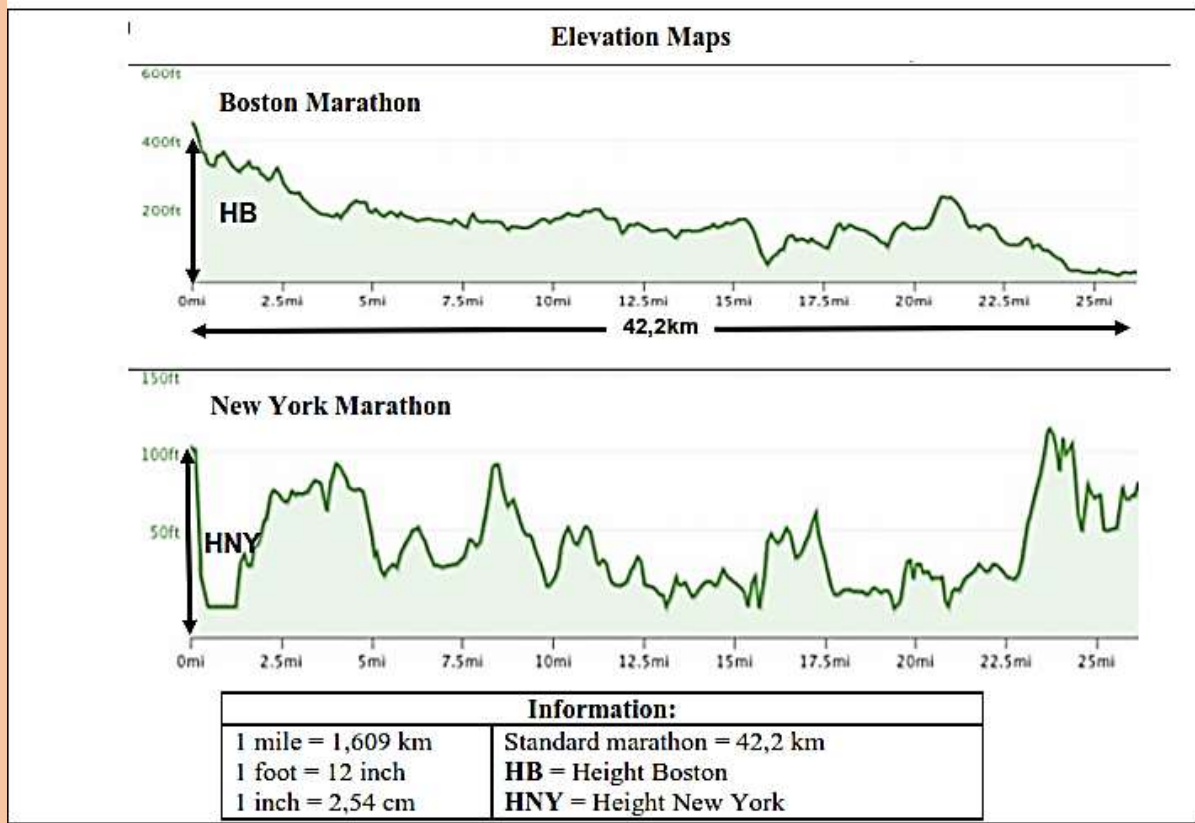
Use ANNEXURE A to answer the questions that follow.

- 1.1.1 Determine the missing values:
- (a) L (round off to the nearest percentage) (4)
- (b) M (2)
- 1.1.2 How much did a dozen eggs cost in January 2017? (3)
- 1.1.3 Describe the general trend in the year-on-year percentage change for vegetables. (2)
- 1.1.4 Mr Jacobs buys maize meal regularly. He did not receive a salary increase from January 2016 to January 2017.
- Explain the impact of the change in maize meal on his household budget. (2)
- 1.1.5 Name TWO other types of living expenses (other than food) that Mr. Jacobs needs to consider in his budget. (2)
- 1.1.6 The projected average year-on-year percentage change for white bread from January 2017 to January 2018 is 8,5%.
- Calculate the projected price of a loaf of white bread in 2018. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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1.2 The elevation maps of two standard marathons, the Boston- and New York marathon, are shown below. Study the maps and use the information given to answer the questions that follow.



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- 1.2.1 The map shows the distance up to 25 miles (mi), which is only a part of the distance of a standard marathon.
- (a) Convert 25 miles to kilometres. (2)
- (b) Calculate the number of miles still needed to be run in order to complete the standard marathon if 25 miles (mi) is already completed by an athlete. (3)
- 1.2.2 Calculate the difference between the height of **HB** and **HNY**. Round your answer to the nearest metre. (5)
- 1.2.3 Which of the two marathons do you consider to be more difficult? Explain. (3)
- 1.2.4 The marathon started at 06:00 on 14 July 2017. Determine an athlete's

4

end time to the nearest minute if his average speed was 19 km/h.

$$\text{Formula: Speed} = \frac{\text{Distance in km}}{\text{Time in hours}} \quad (5)$$

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## QUESTION 2

- 2.1 Tshepang wants to cover the walls in the kitchen and dining area and the living area with a brick-printed wallpaper. The floor- and elevation plans of the house are provided on **ANNEXURE B**.

Use the **ANNEXURE B** to answer the questions that follow:

- 2.1.1 Calculate the total area of the inside walls that will be covered by the wallpaper. Give your answer in squared metres. (12)
- 2.1.2 The cupboard shown on the north wall has a length of 2,8 m and a height of 0,9 m. The roll of brick-printed wallpaper is 0,9 m wide.
- Calculate the length of wallpaper needed to cover the North wall. Give your answer to the nearest metre. (7)
- 2.1.3 A metre of brick-printed wallpaper costs R 37,50 (excluding VAT). How much will Tshepang spend on the wallpaper to cover the North wall? (3)

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2.2

**ANNEXURE C** shows the income and expenditure for households of various socio-economic scenarios. Use **ANNEXURE C** to answer the following questions:

2.2.1 Determine  $N$ , the minimum household income for household A. (2)

2.2.2 Which, if any, of the three households can afford the minimum food basket? Justify your choice. (4)

2.2.3 Businesses have suggested that the minimum monthly household income should have the same value as  $N$  in 2.2.1 above. Is the suggestion justified? Explain. (3)

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### QUESTION 3

- 3.1 Use ANNEXURE D, the seating plan of Nelson Mandela Bay stadium, to answer the following questions:
- 3.1.1 What is the ticket price of block 628? (2)
- 3.1.2 What is the general direction from block 205 to block 222? (2)
- 3.1.3 Use compass directions and lower or upper tier/level to describe the position of block 617 in the stadium. (2)
- 3.1.4 Johnny and his friends attended the test match between South Africa and Argentina. The only tickets that they could book were the following:
- Block 202 – 2 tickets  
Block 225 – 3 tickets  
Block 214 – 1 ticket  
Block 601 – 2 tickets  
Block 629 – 4 tickets
- Johnny estimated that the tickets will cost less than R3 000. Verify, showing all calculations if his estimation is correct or not. (8)
- 3.1.5 Determine the probability (as a decimal) of Johnny and his two friends getting tickets from the south lower tier. (3)
- 3.1.6 The actual length of the field is **140 m**. The measured length of line **JK** is **90 mm**. Determine the scale of the plan, in the form  $1 : \dots$  (3)

- 3.2 There are **12,5%** of the seats allocated to VIP's (Very Important Persons) and season ticket holders. If the capacity of the stadium is **46 000** calculate the maximum number of seats that can be filled by the other spectators. Round your answer to the nearest ten thousand. (5)
- [25]

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#### QUESTION 4

4.1 Statistics SA released data that shows the number of marriages per month that took place from 2011 to 2015. Use the table below to answer the questions that follow:

**TABLE: Number of marriages per month from 2011 - 2015**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	11 353	11 403	13 802	14 808	10 794	10 254	10 767	10 730	13 883	15 828	15 966	27 676
2012	10 866	11 351	14 359	12 941	10 928	10 466	9 850	10 689	14 272	13 491	14 761	27 138
2013	10 106	10 360	13 873	12 805	10 905	10 218	9 776	11 183	13 455	13 507	15 735	26 719
2014	9 526	10 331	13 203	12 107	10 271	9 384	9 975	10 272	12 245	13 686	14 960	24 892
2015	9 401	10 340	11 795	11 795	10 482	9 086	9 086	9 836	11 977	13 500	13 268	18 343

- 4.1.1 Determine the range of the number of marriages for 2013. (3)
- 4.1.2 Determine the probability of randomly selecting a month in 2011 with less than 12 000 marriages. (3)
- 4.1.3 Mbulelo claims that both median and the mean can be used to represent the data on the number of marriages for 2015. Verify, showing ALL calculations, if Mbulelo's claim is correct. (7)
- 4.1.4 Explain why the set of data for 2015 is considered to be bi-modal. (2)
- 4.1.5 Calculate the number of marriages in the fourth quarter of 2014, as a percentage to the total number of marriages for 2014. (6)

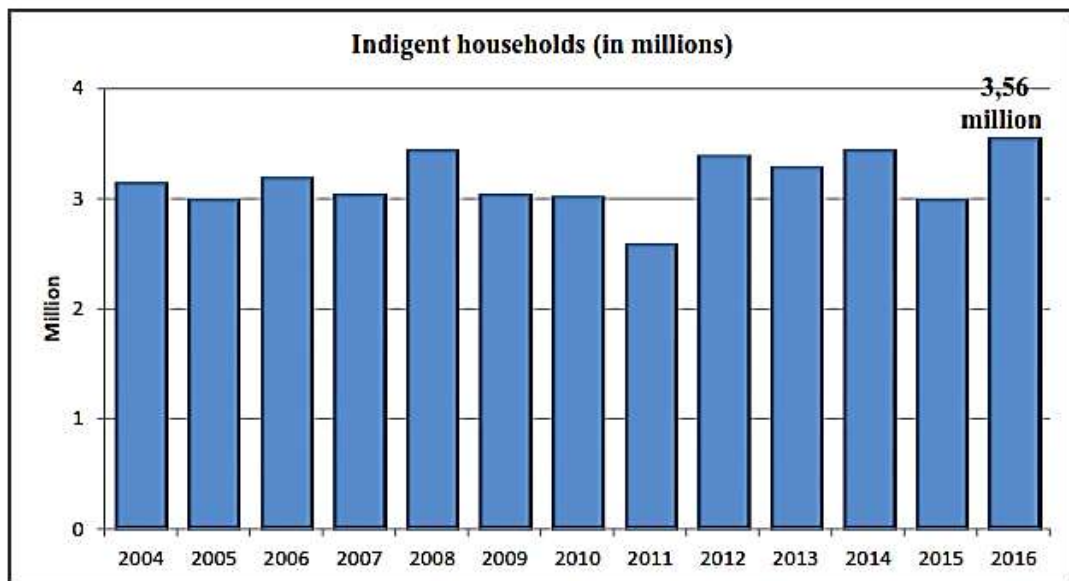
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4.2 The information below shows key facts about indigent (poor) households in South Africa. Study the information and answer the questions that follow:

243 of the 278 municipalities in South Africa had a policy with regard to indigent households in 2016.

Indigent households are entitled to the following:



4.2.1 In Cape Town, residents are requested to use at most 87 litres of water per person per day. If an indigent household of 3 persons use 6 000 litres per month (30 days), would you say they adhere to the request? Show ALL calculations. (5)

4.2.2 According to the figures available from Statistics SA, there was a 16% percentage increase in Indigent households from 2015 to 2016. Calculate how many households were indigent in 2015. (3)

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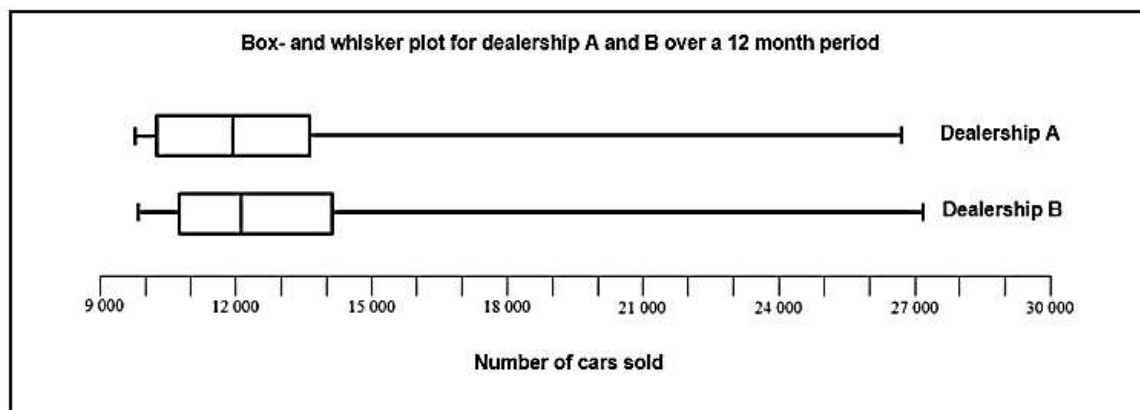
- 4.3 One indigent household uses 8,5 kWh electricity per day. They use a month consisting of 31 days to draw up a budget. What will their budget for electricity be, if the tariffs below are used?

<b>ELECTRICITY TARIFFS</b>	
kWh used	Price in cent/kWh
Less than 50kWh	Free
From 50kWh to 150kWh	66,35c
From 150kWh to 450kWh	80,34c
From 450kWh to 1500kWh	106,37c

(5)  
[34]

### QUESTION 5

- 5.1 The box and whisker plots shows the monthly sales of cars at two dealerships. Use the box and whisker plot below to answer the questions that follow:



- 5.1.1 Estimate the difference between the maximum number of cars sold by Dealership A and Dealership B. (3)
- 5.1.2 Dealership A sold less than 12 000 cars for 6 months of the year. Is the statement true? Explain. (3)
- 5.1.3 Determine the Inter Quartile Range of Dealership B. (4)

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5.2

Mr Jacobs is a 50-year-old South African citizen.

- Mr Jacobs earns a taxable monthly salary of R 31 153,85.
- On his birthday in August he receives a taxable bonus equal to his monthly taxable salary.
- On 1 July 2016 he received a 7.5% salary increase.
- He has two dependants on his medical aid scheme.

The tax table and medical tax credit rates for 1 April 2016 to 31 March 2017 are given below:

**2017 tax year (1 April 2016 - 31 March 2017)**

Taxable income (R)	Rates of tax (R)
0 – 188 000	18% of taxable income
188 001 – 293 600	33 840 + 26% of taxable income above 188 000
293 601 – 406 400	61 296 + 31% of taxable income above 293 600
406 401 – 550 100	96 264 + 36% of taxable income above 406 400
550 101 – 701 300	147 996 + 39% of taxable income above 550 100
701 301 and above	206 964 + 41% of taxable income above 701 300

**Tax Rebates:**

Tax Rebate	2016	*Medical Tax Credit Rates	2016
Primary	R13 257	Per month (R) For the taxpayer who paid the medical scheme contributions	270
Secondary (65 and older)	R7 407	For the first dependant	270
Tertiary (75 and older)	R2 466	For each additional dependant(s)	181

**Note:**\*Medical Tax credits are only deducted after tax was calculated.

Use the information above to answer the questions that follow:

5.2.1 Calculate Mr Jacob's new salary as from 1 July 2016. (3)

5.2.2 Calculate the annual tax of Mr. Jacobs for the tax year, 1 April 2016 – 31 March 2017. (10)

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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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**ANNEXURE A : QUESTION 1.1**

**PACSA food basket showing year-on-year prices:**

Food grouping	Foods tracked	Quantity tracked	Jan 2016 Price	Jan 2017 Price	y/y change (Rands)	y/y change (%)
Starchy foods	Maize meal	25kg	R 179.14	R 244.32	R 65.18	36%
	Rice	10kg	R 76.99	R 80.82	R 3.83	5%
	Cake Flour	10kg	R 80.15	R 84.15	R 4.00	5%
	White bread	8 loaves	R 84.84	R 91.21	R 6.37	8%
	Brown bread	4 loaves	R 38.57	R 41.94	R 3.37	9%
	Samp	5kg	R 37.65	R 48.32	R 10.67	28%
	Pasta	1kg	R 22.16	R 23.99	R 1.83	L
Sugar	White sugar	10kg	R 108.82	R 143.65	R 34.83	32%
Dry beans, Canned beans	Sugar beans	5kg	R 84.32	R 117.82	R 33.50	40%
	Canned beans	3 cans	R 24.47	R 27.88	R 3.41	14%
Fat, oil	Cooking oil	4L	R 87.15	R 81.16	-R 5.99	-7%
	Margarine	1kg	R 31.65	R 36.48	R 4.83	15%
Milk, maas	Fresh Milk	2L	R 23.65	R 27.98	R 4.33	18%
	Maas	2L	R 25.15	R 28.49	R 3.34	13%
Meat, eggs fish	Eggs	30 eggs	R 38.99	R 45.32	R 6.33	16%
	Canned fish	4 cans	R 59.29	R 63.60	R 4.31	7%
	Chicken pieces	6kg	R 131.97	R 176.47	R 44.50	34%
	Chicken feet	4kg	R 61.95	R 85.93	R 23.98	39%
	Chicken necks	6kg	M	R 162.85	R 70.90	77%
	Beef	1kg	R 58.33	R 61.16	R 2.83	5%
	Polony	2.5kg	R 38.97	R 42.82	R 3.85	10%

Vegetables	Carrots	2kg	R 16.96	R 19.30	R 2.34	14%
	Spinach	4 bunches	R 40.00	R 13.32	-R 26.68	-67%
	Apples	1.5kg	R 20.98	R 19.82	-R 1.16	-6%
	Cabbage	2 heads	R 28.55	R 20.97	-R 7.58	-27%
	Onions	10kg	R 45.33	R 38.49	-R 6.84	-15%
	Tomatoes	3kg	R 31.32	R 35.49	R 4.17	13%
	Potatoes	10kg	R 73.33	R 55.49	-R 17.84	-24%
Miscellaneous	Salt	1kg	R 10.64	R 12.15	R 1.51	14%
	Yeast	4 x 7g pkts	R 12.15	R 12.82	R 0.67	6%
	Beef stock	240g	R 15.82	R 18.16	R 2.34	15%
	Soup	600g	R 22.53	R 25.97	R 3.44	15%
	Curry powder	200g	R 23.32	R 29.65	R 6.33	27%
	Rooibos (tea bags)	200g	R 16.64	R 20.32	R 3.68	22%
	Coffee	100g	R 15.99	R 18.32	R 2.33	15%
Cremora	1kg	R 37.31	R 36.32	-R 0.99	-3%	
<b>Total cost of PACSA food basket</b>			<b>R 1 797.04</b>	<b>R 2 092.95</b>	<b>R 295.91</b>	<b>16%</b>

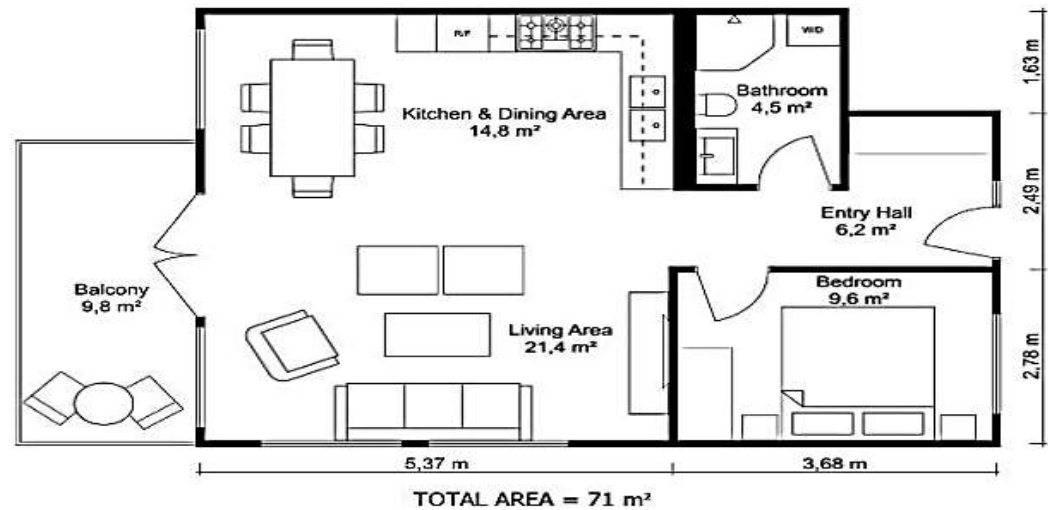
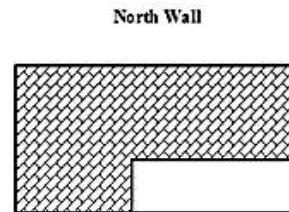
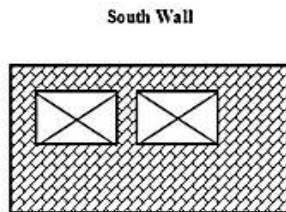
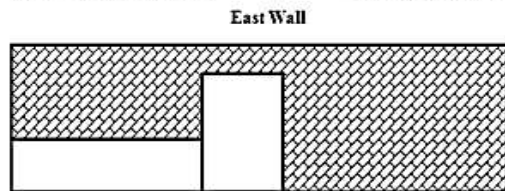
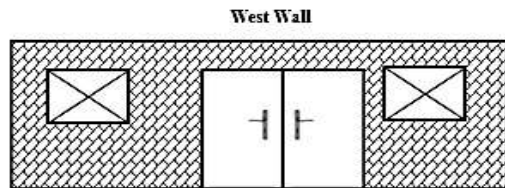
- Year-on-year, the PACSA food basket – which tracks a nutritionally complete set of products – increased by R295.91 (16%) from R1 797.04 in January 2016 to R2 092.95 in January 2017.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE B: QUESTION 2.1

Wall elevation of the Kitchen/Dining area and Living area



<http://www.roomsketcher.com/floor-plans/>

- The height of the inside walls of each room, from the floor to the ceiling, is 2 540 mm.
- The dimensions of the windows are 180 cm × 150 cm.
- Area of a door = 2,889 m<sup>2</sup>
- The height of a door opening is 2,14 m. All door openings are identical.
- The kitchen counters and cupboards are fixed to the wall. The wall area covered by the counters is 2,36 m<sup>2</sup>.
- **Formula: Area = length × breadth**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Possible monthly income and expenditure (BUDGET) for households of various socio-economic scenarios based on suggested spending by business: January 2017**

	HOUSEHOLD A	HOUSEHOLD B	HOUSEHOLD C
<b>INCOME:</b>			
Total Household income	N	R 4 500,00	R 8 000,00
Number of household members	5	5	5
<b>EXPENSES:</b>			
Minus Minimum Food basket	R 3 308,10	R 3 308,10	R 3 308,10
<b>Amount = Income – Food Basket</b>	<b>R-1 508,10</b>	<b>R 1 191,90</b>	<b>R 4 691,90</b>
Minus Burial insurance	R 200,00	R 200,00	R 200,00
Minus Electricity and water	R 573,70	R 573,70	R 573,70
Minus Transport	R720,00	R720,00	R720,00
Minus Education	R 500,00	R 500,00	R 500,00
Minus communication and media	R 150,00	R 150,00	R 150,00
Minus Clothing and footwear	R 416,66	R 416,66	R 416,66
Minus Domestic & household hygiene products	R 604,41	R 604,41	R 604,41
Minus Cultural obligation	R 350,00	R 350,00	R 350,00
<b>TOTAL IN RAND OF SOME ESSENTIAL HOUSEHOLD PRODUCTS</b>	<b>R 3 514,77</b>	<b>R 3 514,77</b>	<b>R 3 514,77</b>
<b>Amount left over AFTER FOOD &amp; SOME ESSENTIAL HOUSEHOLD PRODUCTS</b>	<b>R-5 022,87</b>	<b>R-2 322,87</b>	<b>R 1 177,13</b>

\*Please note expenditure in table above exclude Amount for repayments, health care, rent, emergencies, amongst others.

Table adapted out of Pacsa

- **Household A:** Business's proposal to set the National Minimum Wage level at the lowest existing sectoral determination.
- **Household B:** R4,500 = Unions has called for a National Minimum Wage of between R4,500 and R6,000.
- **Household C:** where PACSA think the National Minimum Wage should be located.

**ANNEXURE C: QUESTION 2.2**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

# PAPER 1

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### INSTRUCTIONS AND INFORMATION

1. This question paper consists of **FIVE** questions. Answer **ALL** the questions.
2. 2.1 Use the ANNEXURES for the following questions:  
  
ANNEXURE A for QUESTION 1.1  
ANNEXURE B for QUESTION 1.2  
ANNEXURE C for QUESTION 4.1  
ANNEXURE D for QUESTION 4.2  
  
2.2 Answer:
  - QUESTION 4.4.1 on the attached ANSWER SHEET A
  - QUESTION 5.2.6 on the attached ANSWER SHEET B.  
2.3 Write your name and grade in the spaces on the ANSWER SHEETS.  
Hand in the ANSWER SHEETS with your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start **EACH** question on a **NEW** page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show **ALL** calculations clearly.
7. Round off **ALL** final answers appropriately according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 1 [30]

1.1 A group of four friends, Sibahle, Kananelo, Collen and Aanadi, planned to share a meal at 'Meet & Eat' Restaurant.

ANNEXURE A shows their order and the bill.

Use ANNEXURE A to answer the following questions:

- 1.1.1 Write down the name of the waiter who served the FOUR friends at the Meet and Eat restaurant. (2)
- 1.1.2 The total amount for all the drinks (liquids) is R84,00 according to the bill. Verify this amount. (2)
- 1.1.3 Calculate the price of one Grape Juice. (2)
- 1.1.4 The minimum gratuity amount is 10% of the Sub-total amount. Determine the minimum gratuity (tip) the FOUR friends should pay to the waiter. (2)
- 1.1.5 Calculate the total amount of the bill. (2)
- 1.1.6 The FOUR friends decided to divide the total amount of the bill equally amongst themselves. Calculate the amount each person must pay. (2)

- 1.2 Nomsa is a member of GEMS Medical Aid scheme.
- She has one dependant (additional member also covered by the scheme at the main member's expense).
  - For medical procedures (e.g. an operation) the scheme pays a certain amount and the balance is paid by the main member.
  - The patient remains liable(responsible) to pay the outstanding amount of the bill if the medical aid did not cover the total amount.

ANNEXURE B shows a statement Nomsa received from Panado Medical Centre.

Study the statement in ANNEXURE B and answer the questions that follow:

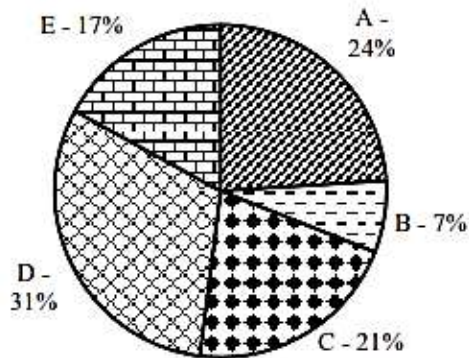
- 1.2.1 Write down:
- a) the name of Nomsa's dependant. (2)
  - b) the amount in arrears indicated on the statement. (2)
- 1.2.2 Determine M, the amount paid by the medical aid for elastocrepe. (2)
- 1.2.3 Write down the amount Nomsa must pay for emergency consultation. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

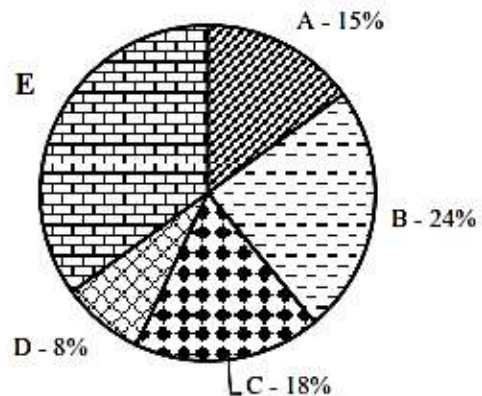
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.3 According to statistics, Sapphire and Emerald are two competitive vehicle-hiring services. They recorded 350 most used vehicles in both Sapphire and Emerald vehicle hiring services. The results of the recordings are shown on the TWO pie charts below.

**Sapphire 2014**



**Emerald 2014**



KEY:

	A	VW
	B	Hyundai
	C	Toyota
	D	Chevrolet
	E	Nissan

Use the pie charts above to answer the following questions:

- 1.3.1 Determine the missing value of **E** for Emerald. (2)
- 1.3.2 Which car is the least rented by Sapphire? (2)
- 1.3.3 Which cars are equally popular with both Sapphire and Emerald? (2)

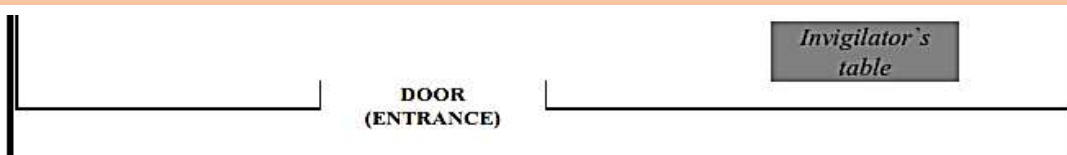
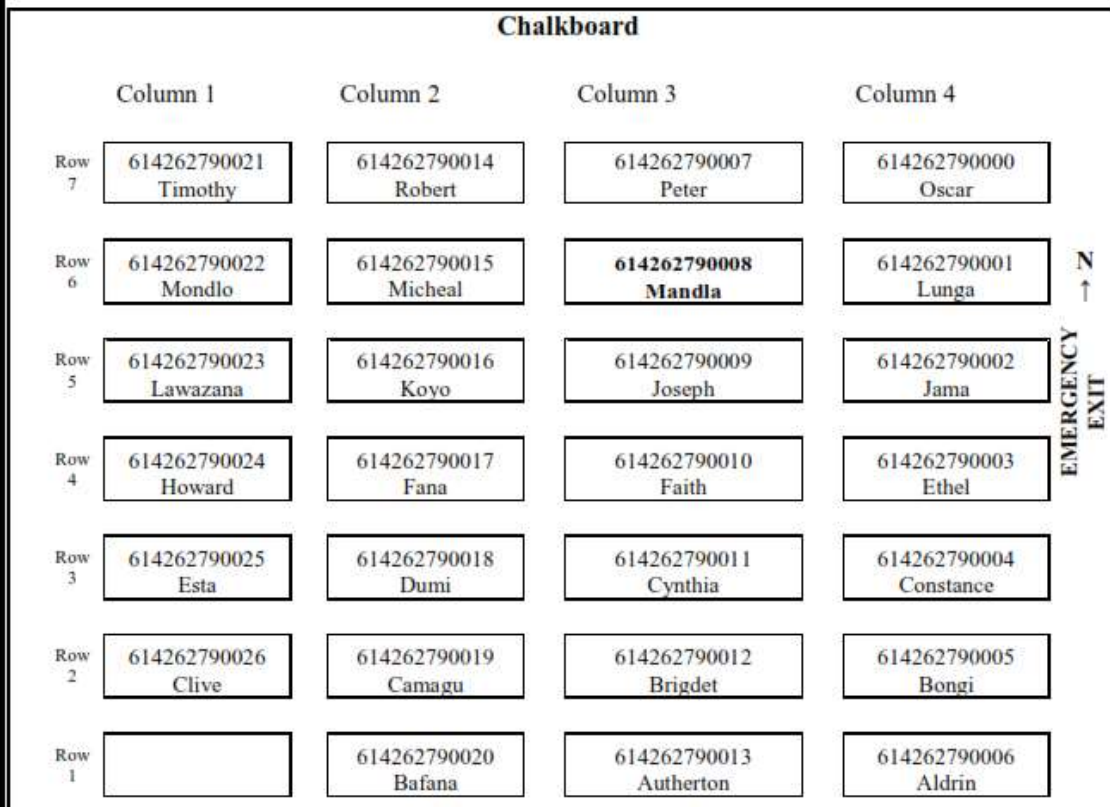
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.4

The diagram below shows a seating plan that was used at Success High School for the 2016 NCS final examinations. Mandla wrote his matric examinations in 2016 and his examination number was 614262790008. The distance between the learners' desks is 1m. All learners are facing South.

**2016 EXAMINATION SEATING PLAN**



- 1.4.1 How many candidates, excluding Mandla, wrote the 2016 NCS examination in this classroom? ( )
- 1.4.2 Use the words 'row' and 'column' to describe the position of Mandla's desk in the classroom. ( )

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Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 2 [32]

- 2.1 Ms Tsie decided to buy the following lawn-mower which was advertised as follows:

***BRILLIANT LAWN-MOWER ON SPECIAL  
HAVE FUN WHILE CUTTING YOUR LAWN!!***

**THE BEST IN THE MARKET AVAILABLE IN A RANGE OF COLOURS**



**Now only R23 099**

**SAVE R900**

**Deposit: R2 300**

**Instalments: R975 x 36 months**

- 2.1.1 What is the special cash price of the lawn-mower? (2)
- 2.1.2 How much did the lawn-mower cost before the special? (2)
- 2.1.3 What percentage of the original cash price is the SAVE amount? (2)
- 2.1.4 Ms Tsie decided to take the lawn-mower on hire purchase. Calculate the total amount that she will pay for the lawn-mower. (3)
- 2.1.5 Calculate how much Ms Tsie would have saved, had she bought the lawn-mower cash. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2

Mrs April wants to buy a car. She saw the following advertisement in a local newspaper and is interested in the car advertised.

**honda jazz**

Priced to go! **R 104 995**

Hatchback | Manual | 2010 | 119,830 kms

Pretoria , Gauteng

**Save R 11 000**



**Option 1**

Deposit: R10 500

Term: 5 years

Interest: 10,5% compounded bi-annually

Admin fee: R1 010

Registration/Licence: R788

**Option 2**

No Deposit required

Term: 5 years

Interest: 12% compounded annually

Admin fee: R1 010

Registration/Licence: R788

Use the information above to answer the following questions:

- 2.2.1 Write down the name of the car in the advertisement. (2)
- 2.2.2 What was the original price of the car before the 'Priced to go' price? (2)
- 2.2.3 Mrs April decides to buy the car using Option 1.
- a) What percentage of the purchase price is the deposit? (3)
- b) How much will Mrs April still need after paying all the initial costs? (3)
- 2.2.4 Name ONE advantage of choosing Option 2. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.3

Mrs. April is concerned about the impact that the projected inflation rate and increase in municipal rates and fees will have on her disposable income. **Table 1** below shows projected tariffs for 2017.

**Table 1: Increase in tariffs for 2017**

Rates and services charged	2016	% increase	2017
Refuse removal	R140,00	A	R157,50
Sanitation	R179,39	13%	R202,71
Water consumption	R170,86	10,5%	R188,80
Electricity consumption (non-prepaid)	R584,79	14,3%	R668,41
Property rates	R380,98	15%	R438,13
Subtotal excluding VAT	<b>B</b>		R1 655,55
VAT on services	R203,84		R231,78
<b>Total</b>	<b>R1 668,86</b>		

Use the information above to answer the questions that follow.

- 2.3.1 Determine the value of A, the percentage increase for refuse removal.  
Use the formula:

$$\text{Percentage increase} = \frac{\text{New amount} - \text{Old amount}}{\text{Old amount}} \times 100\% \quad (3)$$

- 2.3.2 Determine the value of B. (2)

- 2.3.3 Calculate the additional amount per month for which Mrs. April will have to budget, on her municipal account for 2017. (4)

[32]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 3 [30]

3.1 The dimensions of the loading part of a delivery van transporting printing paper are:

Length: 5 380 mm

Width: 1 880 mm

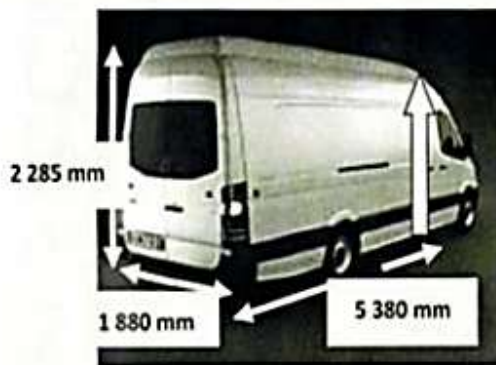
Height: 2 285 mm

The dimensions of a box containing five reams of A4 paper are:

Width: 210 mm

Length: 297 mm

Height: 250 mm



The following formulae may be used:

$$\text{Perimeter} = 2(L + W)$$

$$\text{Area of a rectangle/square} = L \times W$$

$$\text{Surface area of rectangular prism} = 2WH + 2LH + 2LW$$

Where: W = width, L = length, H = height

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 3.1.1 Calculate the perimeter of the floor of the loading part of the van. (2)
- 3.1.2. Determine, in  $\text{mm}^2$ , the floor area of the loading part of the van. (2)
- 3.1.3 Calculate the maximum number of boxes that you can place on the loading floor of the panel van if the length of the boxes are packed alongside the length of the van. (6)
- 3.1.4 Using the height of the van as well as the height of a box of A4 paper, determine how many boxes can be stacked on top of one another inside the van. (3)

- 3.1.5 Hence or otherwise, calculate the maximum number of boxes that can be loaded in the van in the way stated in 3.1.3 and 3.1.4. (2)
- 3.1.6 Calculate the surface area of a box of A4 paper. (5)

3.2 Ashton Secondary School and Montagu High School in the Cape Winelands Education District decided to place a combined order of 252 boxes of A4 paper to save cost. It will first start at Ashton Secondary School and then travel to Montagu High School.

- The boxes of paper are to be delivered from Cape Town.
- Montagu HS needs to use the paper by 8:00 on Monday morning.
- The van will leave Cape Town at 5:30 on Monday morning and will drive at an average speed of 105 km/h to deliver the boxes of paper.
- It takes 20 minutes to off load the boxes of paper at each school.
- It takes 17 minutes to drive from Ashton Secondary School to Montagu High School.
- The distance from Cape Town to Ashton Secondary School is 189 km.

- 3.2.1 Determine the time at which the van will arrive at Ashton Secondary School. The following formula may be used:

$$\text{Time in hours} = \frac{\text{Distance (in km)}}{\text{Speed (in km/h)}} \quad (5)$$

- 3.2.2. At what time will the van arrive at Montagu High School? Will the school receive the paper on time? (3)
- 3.2.3 The boxes have to be delivered to Montagu HS and Ashton Secondary in the ratio 1:2. Determine the number of boxes that need to be delivered at Ashton Secondary. (2)

[30]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

#### QUESTION 4 [28]

- 4.1 Every year, the Department of Basic Education uses the Birchwood Conference Centre in Johannesburg to host their conference. In ANNEXURE C, you will find a site map of the conference center.



Use it to answer the questions that follow.

- 4.1.1 How many entrances lead into the conference centre. (2)
- 4.1.2 State which gate is known as the Main Entrance. (2)
- 4.1.3 Name the street in which Gate 4 is found. (2)
- 4.1.4 Give the general direction of the Staff Village from Gate 2. (2)
- 4.1.5 The Birchwood Conference Centre has on-site accommodation and has room numbers from 101 to 5036.
- In the block labeled 49 on the map, the room numbers range from 5031 - 5036. Determine the number of rooms found in block 49. (2)
- 4.1.6 Determine the length of the MacDonalds plot if the measured distance is 2,5cm. Give your answer in metres. (3)
- 4.2 The Shuttle driver gets to the Mercedes Benz in East Rand Mall (grid reference C6 on the map in ANNEXURE D) and does not know how to get to Birchwood Conference Centre (Hotel). Use the street/road names to explain the route, for the Shuttle driver, from East Rand Mall to Birchwood Conference Centre. (3)

- 4.3 On the day of the conference delegates travelling from Durban (KZN) have the following flight options:

Flight Option	Departure (Durban)	Arrival (OR Tambo)
SAA 330	04:45	06:00
Mango 213	05:10	06:15
KULULA 121	05:30	06:40
SAA 441	06:10	07:15

The Birchwood Conference Centre provides a shuttle service from the airport.

Shuttle number	Departure from the airport
1	6:45 am
2	7:15 am
3	7:50 am

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4.3.1 How long does it take flight SAA 441 to travel from Durban to OR Tambo International Airport? (2)

4.3.2 A delegate arrives on the KULULA 121 flight. It takes a delegate 45 minutes to disembark from the plane, collect his luggage and get to the shuttle departure point.

Which shuttle number will the delegate need to use? Show ALL calculations. (3)

4.4 Xolani has to buy lunch for his staff. At the local garage he has the option of hamburgers or pies to eat and the choice of Coke, water or juice to drink.

4.4.1 Using **ANSWER SHEET A**, fill in the missing items to complete the Tree Diagram. (5)

4.4.2 Determine the probability of one staff member receiving a pie. (2)

**[28]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

5.1

In 2016 and 2017 a group of friends decided to take part in the Cape Argus Pick-n-Pay Cycle Tour as a team.

Table 2 below summarizes the times in which each member of the team completed the tour in 2016 and 2017.

**Table 2: Time taken to complete the tour in 2016 and 2017**

Name	Age in 2016	Time (2016)	Age in 2017	Time (2017)
Naas	18	03:47:43	19	03:13:22
Kohli	17	04:10:30	18	Injury
Frank	17	03:57:16	18	04:25:14
Jazzman	16	04:01:27	17	03:39:45
Sbu	18	03:38:10	19	04:26:51
Joe	17	05:05:35	18	03:44:49
Kagiso	18	04:52:00	19	Injury
Mike	20	04:52:00	21	03:56:38
Jonathan	25	05:38:01	26	Injury
Sizwe	25	05:28:36	26	06:05:10
Jackson			26	05:33:43
Janda			29	06:11:59

Use the information in the above TABEL 2 to answer the following questions:

- 5.1.1 Write down the total number of members belonging to the team in 2017. (2)
- 5.1.2 Give the names of the members who were NOT part of the team in 2016. (2)
- 5.1.3 Determine the modal age of the 2017 club members. (2)
- 5.1.4 Determine the age range for members in 2016. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

5.2

The 2016 and 2017 times for the team rounded to the nearest minute, are shown below.

	John	Sibu	Mike	Tumi	Cole	Joe	Pete	Ed	Stew	Piet
2016	306	292	250	228	338	329	281	237	251	292
2017	193	220	225	237	265	267	334	265	342	

- 5.2.1 Is the data above discrete or continuous? Motivate your answer. (3)
- 5.2.2 Calculate the mean time for 2017. Give your answer in hours and minutes. (5)
- 5.2.3 Determine the median time for 2016. (3)
- 5.2.4 Who was the fastest rider in 2016? (2)
- 5.2.5 Which rider improved the most from 2016 to 2017 and by how many minutes? (3)
- 5.2.6 Use the graph on **ANSWER SHEET B** showing the times for the riders for both 2016 and 2017. Complete the graph for the missing data. (6)

[30]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE A**

**QUESTION 1.1**

**Table 1: Meals ordered by the FOUR friends at ‘Meet & Eat’ restaurant.**

Sibahle	Kananelo	Collen	Aanadi
2 Sodas	Fruit cocktail juice	Green salad	Nachos
Green salad	Chicken &Avo	Vegetarian pizza	Ribs
Garlic loaf	salad	Chocolate milk	2 Grape juices
Steak and chips		shake	Ice cream & chocolate sauce

**Table 2:**

**Combined bill for meals ordered by the FOUR friends from Meet & Eat restaurant**

<b>BILL</b>	
<b>Meet &amp; Eat Restaurant</b>	
19 December 2016	
Table: 7	
Waiter: Mark	
1 Soda	R 12.50
1 Fruit Cocktail Juice	R 14.50
1 Chocolate Milkshake	R 15.50
2 Grape juices	R 29.00
2 Green Salads	R 46.00
1 Chicken & Avo Salad	R 48.00
1 Garlic Loaf	R 28.00
1 Nachos (Hot)	R 42.00
1 Steak & Chips	R105.00
1 Vegetable Pizza	R 65.00
1 Rib (Special)	R 92.00
1 Soda	R 12.50
1 Ice cream & Choc Sauce	R 24.00
<b>Sub-total:</b>	<b>R534.00</b>
Gratuity (Tip):	.....
Total Amount:	.....

**KEY:** Gratuity(tip) is an amount of money given to the waiter by a customer in return for service.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

20/11	HBEdi Urine Dipstick, per dipstick	Lindi	4188	1	13,10	13,10	0,00	494,66
20/11	HBEdi 831832002	Lindi	0201	1	5,02	5,02	0,00	499,68
Only unpaid values are reflected								
<b>REMITTANCE</b>								

<b>STATEMENT</b>		<b>PANADO MEDICAL CENTRE</b> PO BOX 6667 East London,5201 Tel: 043-123 6574,	
Mrs Nomsa Lukhoma Box 2029 Greenfields 5208	<b>Scale of benefits</b> Prac. no: 4515652222 Med Aid: Gems Med aid no:000154765	<b>Balance due</b> Account no.: Employer:	R499,68 089338 Dept. of Education

*Items or values marked with (\*) are from a previous month.*

Date 2016	Reference	Patient	Code	Qty	Original	M/A Portion	Member Liabile	Balance
5/9	HBEdi* 432075 003 Elastocrepe	Nomsa	0201	1	89,80	M	24,46*	24,46
20/11	HBEdi New and established Patient: Consultation Pain Localised to other parts Of abdomen	Lindi	0190	1	309,70	309,70	0,00	334,16
20/11	HBEdi For emergency consultation	Lindi	0146	1	147,40	108,49	38,91	481,56

Mrs Nomsa Lukhoma P.O. Box 2029 Greenfields 5208	Date: 20/11/2016 Dr J Namroo Banking details: Nedbank Corporate Branch Branch code: 195456 Acc. no.: 132 567 4359
180+ days: 0,00      150 days: 0,00 120 days: 0,00      90 days: 0,00 60 days: 24,46      30 days: 0,00 Current : 475,22      Total due: R499,68	Please fax proof of payment



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



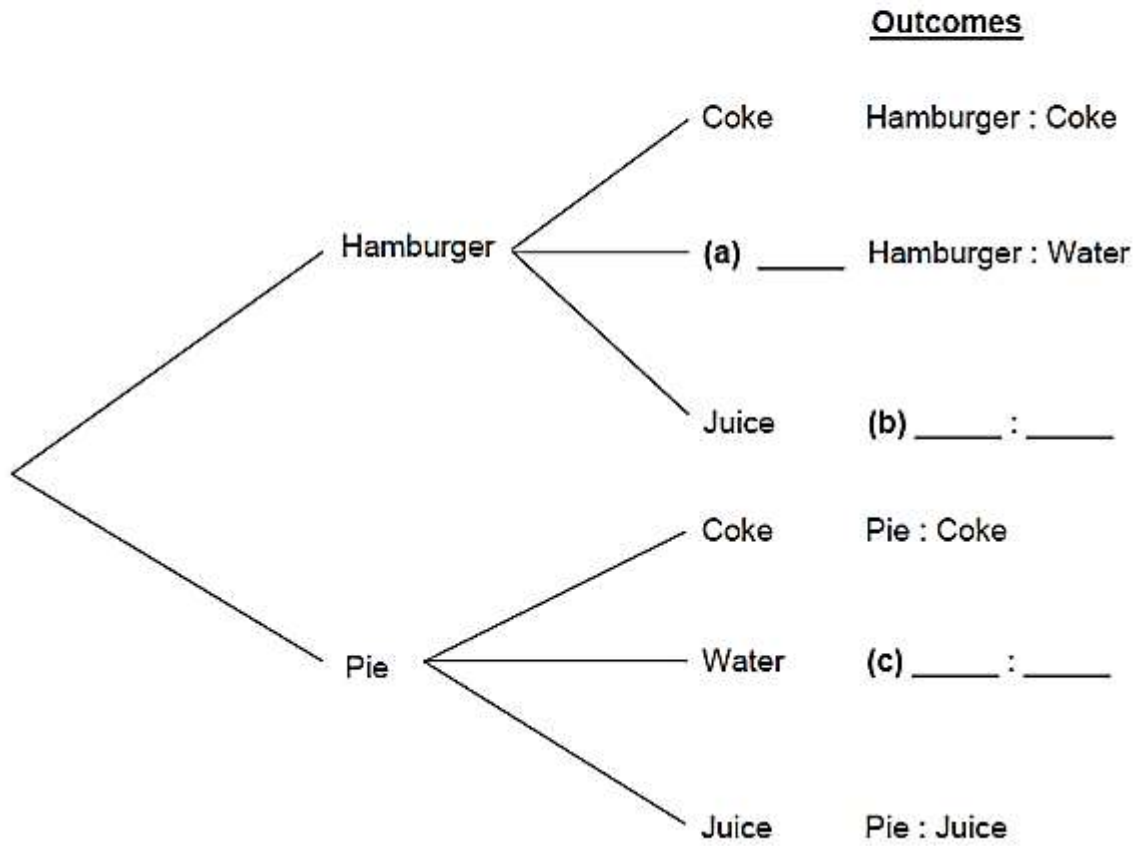
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANSWER SHEET A**

**NAME:** \_\_\_\_\_

**QUESTION 4.4.1**



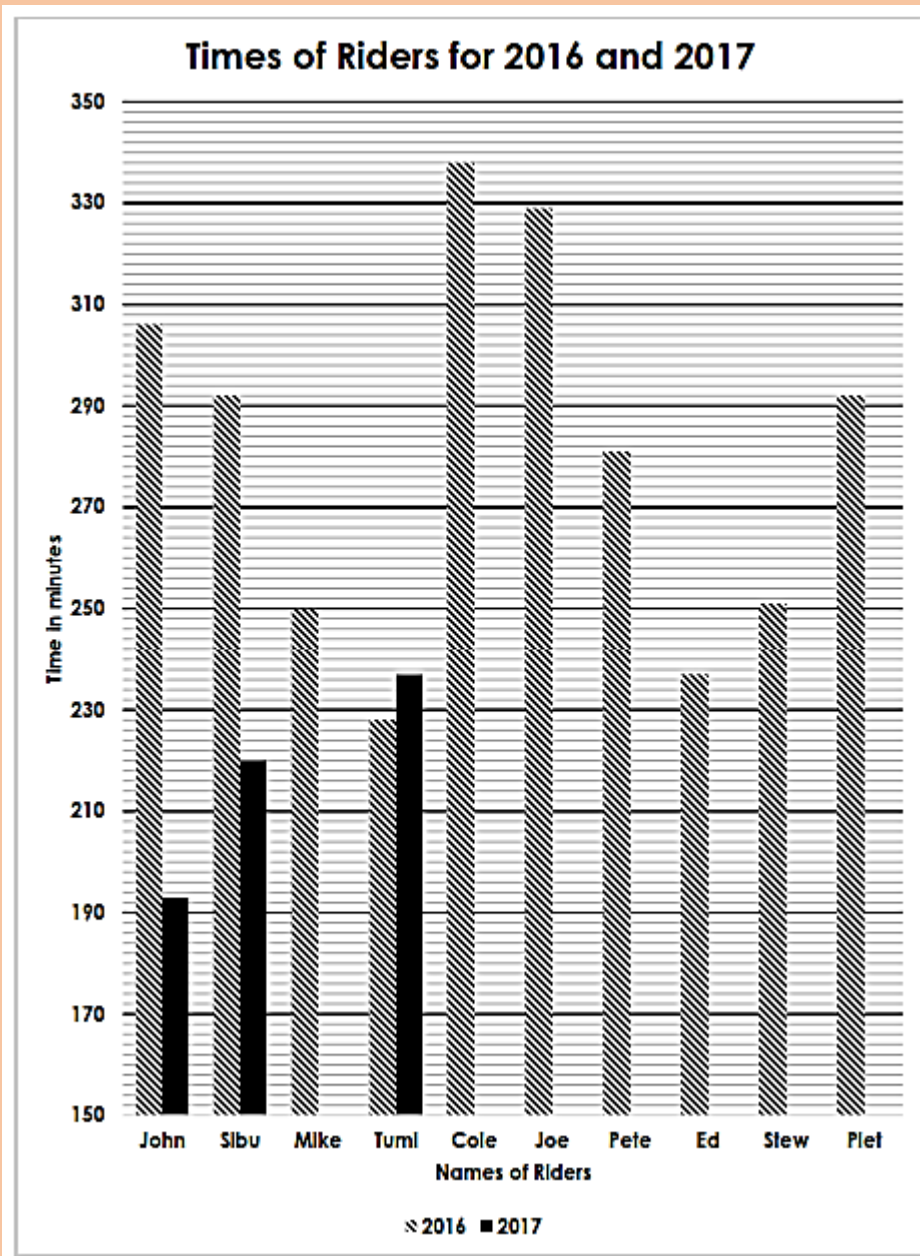
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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANSWER SHEET B

NAME: \_\_\_\_\_

QUESTION 5.2.6



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### **INSTRUCTIONS AND INFORMATION**

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. 2.1 Use the ANNEXURES in the ADDENDUM to answer the following questions:  
  
ANNEXURE A for QUESTION 1.4  
ANNEXURE B for QUESTION 4.1  
ANNEXURE C for QUESTION 4.2  
ANNEXURE D for QUESTION 5.3  
  
2.2 ANSWER SHEET for QUESTION 5.3.3.  
Write your GRADE and NAMES in the spaces provided on the ANSWER SHEET. Hand in the ANSWER SHEET with your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.4 The distances between the cities in South Africa are shown in ANNEXURE A. Use it to answer the following questions.

1.4.1 Write down the distance between Mafikeng and Port Elizabeth. (2)

1.4.2 Name TWO cities that are equal distance from Kimberley. (2)

1.4.3 Which two cities are furthest apart? (2)

### QUESTION 1

1.1 Ben buys a bicycle on lay-bye for R3 200. He pays a deposit of R750 and afterwards chose to pay R300 monthly to cover the balance.

1.1.1 Express the deposit as a percentage of the purchase price. (2)

1.1.2 Determine the balance, after the deposit has been paid. (2)

1.1.3 Determine the total amount paid after the deposit and five instalments has been paid. (2)

1.2 Karen bought 50 Kwh of electricity from her municipality in June 2017 when the tariff was 0,8865 R/Kwh (Rand per kilo-watt hour), including VAT.

1.2.1 Calculate the rate (in cents) for the tariffs charged for the 50 Kwh of electricity. (2)

1.2.2 Calculate the total amount charged for the 50 Kwh of electricity. (2)

1.2.3 Write the abbreviation VAT out in full. (2)

1.3 A care-taker at a school is paid at the rate of R26 per hour worked. He works from 7:30 am for 7 hours, excluding a 15-minute tea break and 45-minute lunch break. He does not work during weekends.

1.3.1 Determine the time when he goes off duty. (2)

1.3.2 Calculate his income if he worked for four weeks. (2)

1.4 The distances between the cities in South Africa are shown in ANNEXURE A. Use it to answer the following questions.

1.4.1 Write down the distance between Mafikeng and Port Elizabeth. (2)

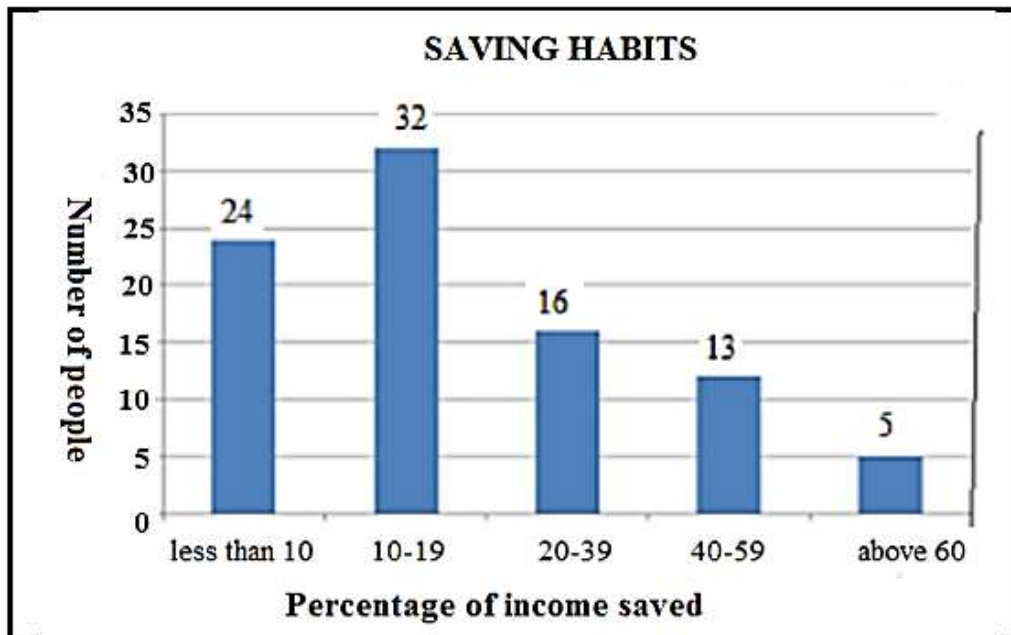
1.4.2 Name TWO cities that are equal distance from Kimberley. (2)

1.4.3 Which two cities are furthest apart? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 1.5 A research was carried out among some parents of Zozo High School to indicate the percentage of their income they saved in June 2017. The results are shown on the graph below.



- 1.5.1 Determine the number of people that took part in the survey. (2)
- 1.5.2 Calculate the number of people who saved less than 20% of their income. (2)
- 1.5.3 What was the modal range? (2)
- 1.5.4 Write down the type of graph used to display the information. (2)

[30]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## QUESTION 2

- 2.1 In South Africa many families solely depend on social grants to sustain their livelihood. Nobuzwe, a 78-year-old grandmother lives with her four grandchildren and takes care of them. Study the information in TABLE 1 below on social grants and answer the questions that follow.

Types of social grants	2015/2016 (in Rand)	2016/2017 (in Rand)
State old age: (60–75 years)	1 415	1 505
State old age: (over 75 years)	1 435	1 525
War Veterans	1 435	...
Disability	1 415	1 505
Foster Care	860	890
Care Dependency	1 415	1 505
Child Support	330	350

[Adapted from *People's guide to the budget*]

- 2.1.1 Identify the social grant that increased the least over the two financial years. (2)
- 2.1.2 Two of her four grandchildren received a child support grant. Calculate the total amount of social grant Nobuzwe and the two grandchildren receive monthly for the 2016/2017 financial year. (3)
- 2.1.3 The War Veterans' social grant was increased by 6,27% at the end of the 2015/2016 financial year. Calculate the monthly amount after the increase to the nearest rand. (3)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 2.2 Ludwe, Nobuzwe's son bought tyres for his expensive car from Lee Tyre and Exhaust centre in Cape Town. Study the information on the invoice below and answer the questions that follow.


Lee Tyre and Exhaust Centre: Cape Town.		Tax Invoice Invoice no.: 0021548 Time printed: 11:10 Ref no.: 54383644/P Date: 02/07/2016	
R – Rands    VAT – Value Added Tax			
Item detail	Price excluding VAT: (R)	Quantity	Net Value (R)
813750 FS TZ Firehawk tyres	1 155,26	4.000	A
BBO Wheel balance (Standard)	28,95	4.000	115,80
WWA 1 Wheel alignment	192,98	1.000	192,98
		Sub-total	4 929,82
		VAT	690,18
		Grand total	5 620,00
		Change	0,00

- 2.2.1 Calculate the value of A, the Net value of Firehawk tyres. (2)
- 2.2.2 Write down the amount Ludwe received as change. (2)
- 2.2.3 In August ONLY the tyres were discounted by 5,6%. Calculate how much Ludwe would have paid for the tyres, including VAT. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 2.3 Sasol has exploration, development, production, marketing and sales operations in 36 countries around the world. Study the revenue contributions and the total capital investments by region shown in TABLE 2 below and answer the questions that follow.

TABLE 2:  2015					
Total capital investments by region (in billions)			Contribution to Revenue by region (in billions)		
South Africa	Rest of Africa	Rest of the world	South Africa	Rest of Africa	Middle East
R19,84	R2,71	R0,45	R96,0	R8,3	R3,9
Europe	Canada	United States	Europe	Asia	Americas
R1,8	R2,71	R17,59	R36,8	R12,0	R28,2

[www.sasoltechnox.co.za]

- 2.3.1 Write down the amount contributed to Revenue by the Rest of Africa. (2)
- 2.3.2 Calculate the total capital investments by Sasol in all regions. (2)
- 2.3.3 Convert the total capital investment in Europe into Euros.  
Given that 1 Euro = R15,3728 (2)
- 2.3.4 Calculate the difference in contribution to revenue between South Africa and Europe. (3)
- 2.3.5 Express the capital investment in the United States as a percentage of the total capital investments. (3)
- 2.3.6 Write down Europe's capital investments, to that of Europe's revenue contribution in the simplest ratio.  
Give your answer in the form: 1 : ... (3)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 2.4 Lerato High School had a memorial service for Anako, one of Nobuzwe grandchildren that was in Grade 10. Study the quotation from TABLE 3 below and answer the questions that follow.

Copies	A3				A4			
	Black and White		Colour		Black and White		Colour	
Quantity	S/S	D/S	S/S	D/S	S/S	D/S	S/S	D/S
1–250	R3,50	R4,00	R10,00	R12,00	R1,50	R2,00	R5,00	R6,00
251–500	R3,00	R3,50	R9,50	R11,50	R1,00	R1,50	R4,50	R5,50
501–1 000	R2,80	R3,00	R9,00	R11,00	R0,85	R1,05	R4,00	R5,00
1 000 <sup>+</sup>	R2,50	R2,70	R8,50	R10,50	R0,75	R0,95	R3,00	R4,50

S/S – Single sided      D/S – Double sided

- 2.4.1 The school will display **TWENTY FOUR** A3 single sided colour advertisements in the community and **ONE** A3 single sided colour advertisement outside the hall. Calculate the total amount the school will pay for these copies. (2)
- 2.4.2 The school will print 260 double sided black and white A4 programmes for the service. Calculate the total cost for the programs. (2)
- 2.4.3 Write down the amount charged per copy if you copy 520 A3 double sided colour copies. (2)
- 2.5 **The prices of 1 kg of corn flakes was R52,95 in June 2016 and R55,95 in June 2017.**
- 2.5.1 The price changes shown above are as a result of inflation. Explain the term *inflation* from the above context. (2)

- 2.5.2 Calculate the inflation rate used for the price changes on the cornflakes. Give your answer to the nearest percentage.

You may use the formula:

$$\text{Inflation rate} = \frac{\text{New price} - \text{Old price}}{\text{Old price}} \times 100$$

(3)  
[42]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### QUESTION 3

- 3.1 Excessive sugar intake is a health hazard. Study the information about the amount of sugar in the chosen items mentioned in the TABLE 4 below and answer the questions that follow.

**TABLE 4: AMOUNT OF SUGAR IN DIFFERENT CHOSEN ITEMS**

Item	Amount of sugar (in grams) (g)	Capacity of an item
Sports drink	28	500 ml
Flavoured water	20	500 ml
Medium muffin	10,6	65 g
Sweetened fizzy drink	55	500 ml
Vitamin water	27,5	500 ml
Chocolate bar	41,2	80 g
1 tablespoon tomato sauce	7,4	...
Ice tea	28	330 ml

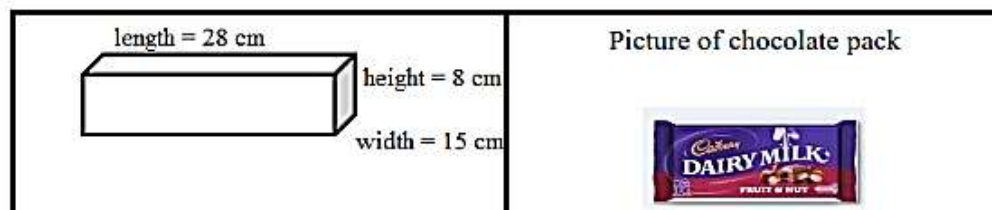
[Source: *Discovery Vitality Kids report 2014 illustrations, Sock*]

**NOTE:** 1 teaspoon = 4,18 g      1 cup = 250 ml

- 3.1.1 Rose drinks a can of ice tea and eats two medium muffins for breakfast, one chocolate bar at break and one sports drink after running in the afternoon. Calculate Rose's total amount of sugar intake. (3)
- 3.1.2 Determine the number of teaspoons of sugar in the vitamin water drink. Give your answer to the nearest teaspoon. (3)

- 3.1.3 Calculate the number of cups you will get when you buy 50 bottles of sports drink for your school teams. (2)

- 3.2 The box shown below is used to pack 80 rectangular chocolate bars. The measurements of the box are: length = 28 cm, width = 15 cm and height = 8 cm.

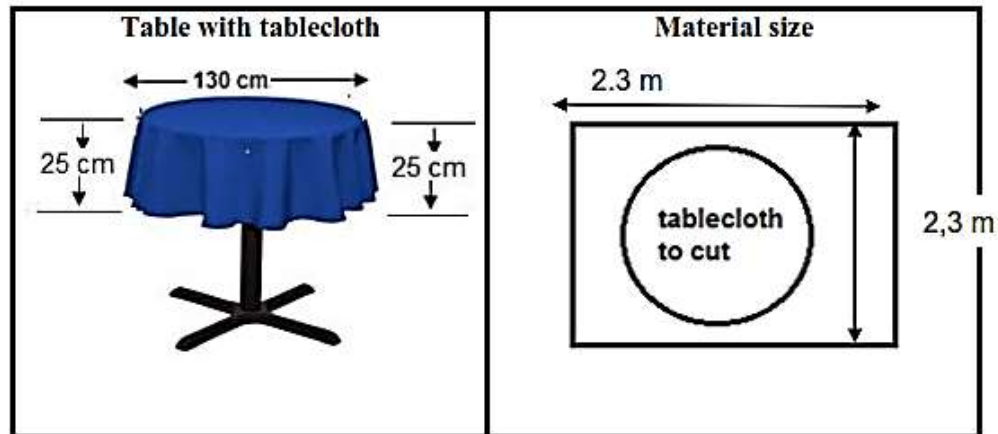


- 3.2.1 Calculate the volume of the box.  
You may use the formula.  
**Volume = length × width × height.** (2)
- 3.2.2 Determine the thickness of a chocolate if the area of its base is 35 cm<sup>2</sup>.  
You may use the formula:  
**Volume = area of base × thickness** (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 3.3 The table Lindi uses for functions in a tent has a diameter of 130 cm. The circular tablecloth used on the table overhangs 25 cm, all round. To make the tablecloth she has to add 1,8 cm right around for the hem. The tablecloth material measures 2,3 m wide and 2,3 m in length.



- 3.3.1 Calculate the diameter of the tablecloth to be cut from the material, including the additional centimetres for the hem. (2)

- 3.3.2 Calculate the area (in  $m^2$ ) of the tablecloth material.

You may use the formula:

$$\text{Area} = \text{Length} \times \text{Breadth} \quad (2)$$

- 3.3.3 Calculate the area (in  $m^2$ ) of a tablecloth to be cut by Lindi.

You may use the formula:

$$\text{Area} = \pi (\text{radius})^2, \text{ where } \pi = 3,142 \quad (3)$$

- 3.3.4 Calculate the amount of material wasted when cutting the table cloth.

You may use the formula:

$$\text{Wasted material} = \text{Area of a material} - \text{Area of tablecloth to be cut} \quad (2)$$

[23]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

#### QUESTION 4

4.1 Study the map on ANNEXURE B that shows the sample points for testing Escherichia coli (*E. coli*) and Blue Green Algae counts per 100 ml. Answer the questions that follow.

4.1.1 Write down the total number of bridges found upstream (north east) of the R59 bridge. (2)

4.1.2 Name the SIXTH sample point on the map starting from the west side. (2)

4.1.3 Lindi travelled by boat from Ascot Bridge to Vaalview Aquatic Club. Name the side streams (tributaries) to the Vaal River that she will pass. (2)

4.1.4 The distance between the R59 Bridge and Railway Bridge is 3 km. Calculate the distance on another map if the scale is 1 : 25 000. (3)

4.2 Study ANNEXURE C showing the diagrams and corresponding letters, A; B; C and D provided in order to assemble the cot and finally form a junior bed.

4.2.1 (a) Write down the number of holes in the end panels. (2)

(b) Name the wooden parts that must be removed, to form the junior bed. (2)

(c) Which assembly illustration shows that the base is now added? (2)

4.2.2 Calculate the number of pins and bolts needed to assemble the cot. (2)

4.2.3 Determine the probability of randomly selecting an 80 mm bolt from a bag containing only the bolts. Give your answer as a simplified common fraction. (3)

[20]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 5

5.1 TABLE 5 below shows the number of learners who were condoned to Grade 12 (made to progress to Grade 12). Study the table and answer the questions that follow.

**TABLE 5: PROGRESSED LEARNERS**

Province	Total number of progressed learners who		
	wrote matric in 2015	passed matric in 2015	currently is in matric in 2016
Eastern Cape	11 705	2 625	18 255
Free State	5 105	2 600	7 362
Gauteng	4 568	2 149	N/A
KwaZulu-Natal	10 070	4 765	24 549
Limpopo	13 022	3 492	27 523
Mpumalanga	5 091	2 290	11 160
Northern Cape	1 963	613	2 280
North West	3 543	2 122	6 654
Western Cape	3 589	1 404	3 058
<b>TOTAL</b>	<b>A</b>	<b>22 060</b>	<b>...</b>

- 5.1.1 List the provinces with the number of progressed learners less than 5 000 in 2016. (2)
- 5.1.2 Calculate the value of A in the table. (2)
- 5.1.3 Arrange the number of progressed learners who passed matric in 2015 in ascending order. (2)
- 5.1.4 Determine the median of progressed learners who passed matric in 2015. (2)
- 5.1.5 Calculate the difference between the progressed learners who passed Grade 12 in 2015 from the Eastern Cape and Western Cape. (3)
- 5.1.6 Calculate the mean number of the progressed learners who wrote matric in 2015. Give your answer to the nearest whole number. (3)
- 5.1.7 Identify the province with the highest number of progressed learners in 2016. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 5.2 Label the box and whisker diagram by matching the terms below with the letter indicated on the diagram.

Mean; Median; Mode; Minimum; Lower Quartile; Upper Quartile; Maximum; Range



ONLY write down the letter and the correct term. (4)

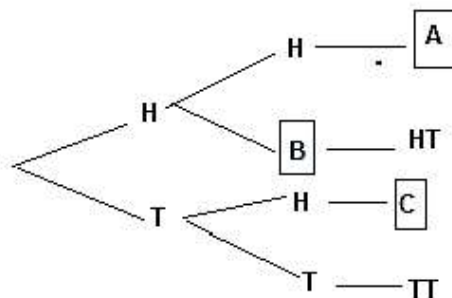
- 5.3 Study TABLE 6 in ANNEXURE D that shows the sample points for testing Escherichia coli (E. coli) and Blue Green Algae counts per 100 ml to answer the questions that follow.

5.3.1 Identify the number(s) of sample points with the same values readings for the Blue Green Algae. (2)

5.3.2 At sample point 8, the readings were 291 for E. coli counts per 100 ml. Write down the guideline on such readings. (2)

5.3.3 Sketch the line graph showing the readings for Blue Green Algae counts per 100 ml at all sample points. Use the ANSWER SHEET to draw the graph. (6)

- 5.4 Ludwe tossed a coin twice and recorded all the possible outcomes as displayed in the tree diagram below:



5.4.1 Write down the possible outcomes represented by the letters A, B and C. (3)

5.4.2 Determine the probability of getting two heads when the coin is tossed two times. (2)

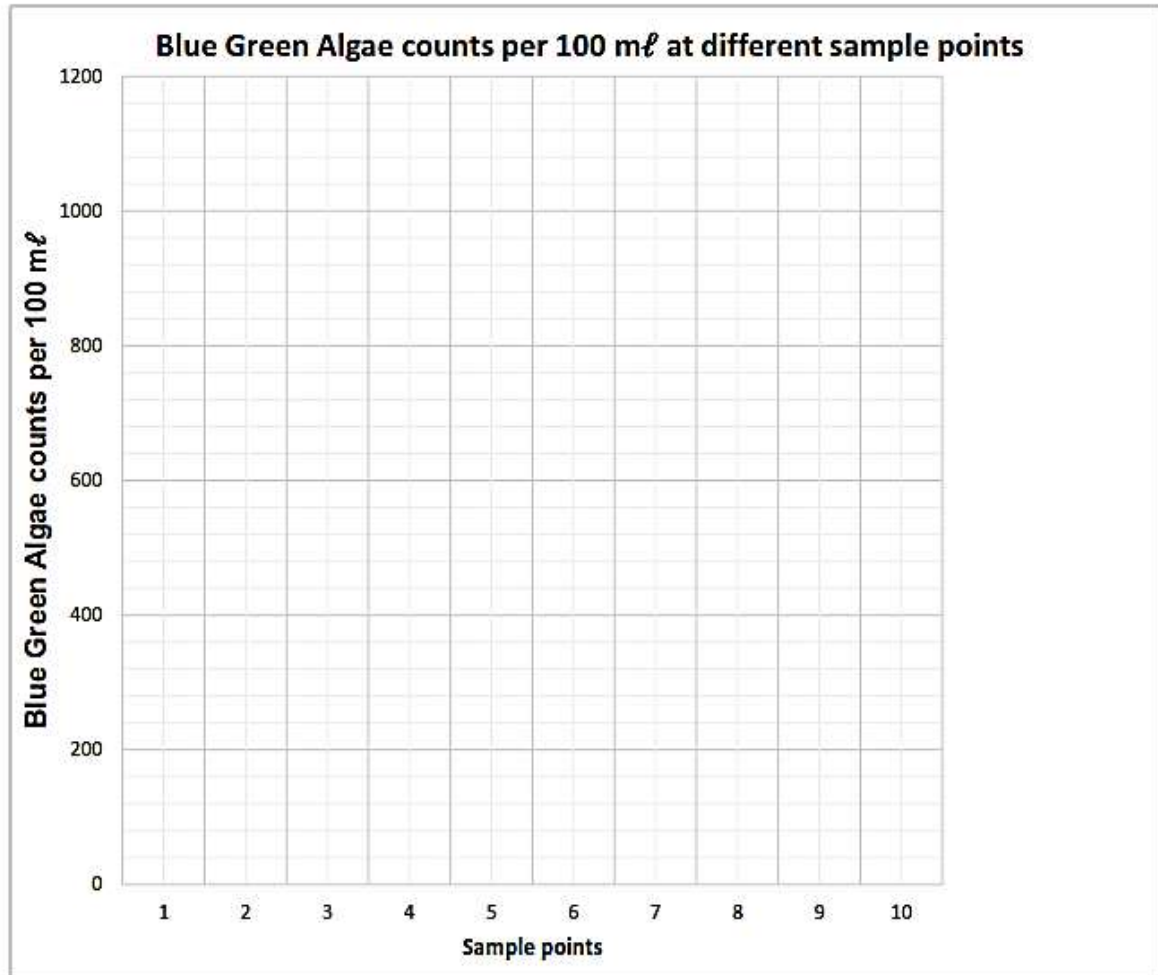
[35]

TOTAL: 150

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

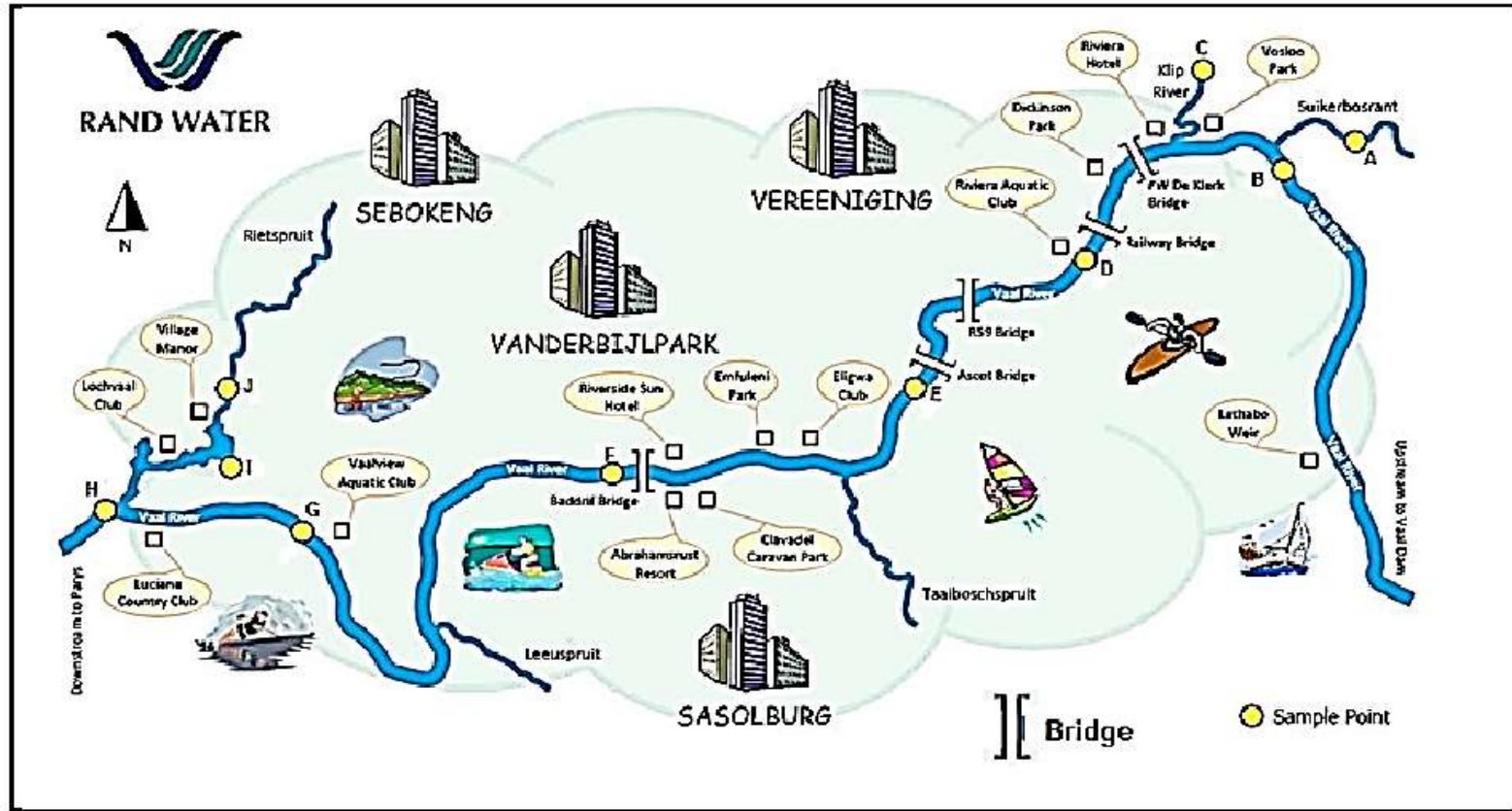
**QUESTION 5.3.3**



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

QUESTION 4.1: ANNEXURE B



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE A: QUESTION 1.4**

**DISTANCES IN KM BETWEEN THE CITIES IN SOUTH AFRICA**

	Bloemfontein	Cape Town	Durban	East London	Johannesburg	Kimberley	Mafikeng	Port Elizabeth	Pretoria	Umtata
Bloemfontein	–	1004		584	398	177	464	681	455	570
Cape Town	1 004	–	1 753	1 079	1 402	969	1 343	769	1 460	1 314
Durban	634	1 753	–	674	557	811	821	984	636	439
East London	584	1 079	674	–	982	780	1 048	310	1 040	235
Johannesburg	398	1 402	557	982	–	476	287	1 075	58	869
Kimberley	177	969	811	780	476	–	380	743	530	747
Mafikeng	464	1 343	821	1 048	287	380	–	1 141	294	1 034
Polokwane	706	1 710	886	1 290	297	780	569	1 383	250	1 181
Port Elizabeth	681	769	984	310	1 075	743	1 141	–	1 133	545
Pretoria	455	1 460	636	1 040	58	530	294	1 133	–	928
Umtata	570	1 314	439	235	869	747	1 034	545	928	–

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 4.2: ANNEXURE C**

**Illustration for assembling Pioneer cot and later junior bed**

Cot parts below:					
2 x Allen Key	4 x Drop side glide pins	4 x Capping nuts	4 x 40 mm Connecting bolts	4 x 70mm connecting bolts	4 x 80mm bolts for base only

**Actual sizes**

Fixed Side

Drop Side

Base

2x End Panels Identical

Glide Pin Holes

Top Hole

Bottom Hole

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**QUESTION 5.3: ANNEXURE D**

**TABLE 6: RESULTS OF THE TEST FOR ESCHERICHIA AND BLUE GREEN ALGAE AT DIFFERENT SAMPLE POINTS AND A GUIDELINE TO THE RISK REGARDING READINGS**

<b>Escherichia coli (E. coli)</b>		<b>E. coli counts per 100 ml at sample points</b>									
Possible symptoms include: Skin irritations, infections and gastrointestinal disorders*	Sample points	1	2	3	4	5	6	7	8	9	10
	Results	236	8	649	488	140	108	16	291	1 236	28
Guideline	Low risk of gastrointestinal disorders E. coli < 130 counts/100 ml	Slight risk of gastrointestinal disorders E. coli 130–200 counts/100 ml			Significant risk of gastrointestinal disorders E. coli 200–400 counts/100 ml			High risk of gastrointestinal disorders E. coli >400 counts/100 ml			
<b>Blue Green Algae</b>		<b>Blue Green Algae counts per 100 ml at sample points</b>									
Possible symptoms include: Skin irritations, infections and gastrointestinal disorders*	Sample points	1	2	3	4	5	6	7	8	9	10
	Results	181	121	121	39	294	213	422	1 086	121	543
Guideline	Low risk Blue Green Algae < 20,000 cells/ml	Moderate risk Blue Green Algae 20,000–100,000 cells/ml				High risk Blue Green Algae >100,000 cells/ml					

[Adapted from *Barrage Weekly*, 03 June, [www.reservoir.co.za](http://www.reservoir.co.za)]

\*If ingested. X sample not received / no information available. Reports generated every Friday of the year.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Use the ADDENDUM with ANNEXURES for the following questions:

ANNEXURE A for QUESTION 1.1  
ANNEXURE B for QUESTION 2.1  
ANNEXURE C for QUESTION 2.2  
ANNEXURE D for QUESTION 3.1  
ANNEXURE E for QUESTION 3.2  
ANNEXURE F for QUESTION 4.2

ANSWER SHEET 1 for QUESTION 4.2.4 which is attached to the addendum.

Write your NAME in the spaces provided on the ANSWER SHEET and hand in the ANSWER SHEET with your ANSWER BOOK.

3. Number the questions correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers appropriately accordingly to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 1

1.1 Mrs May is a single mother who is an educator earning R336 000 per annum. She has two children, a 19-year-old boy who is at university and a 24-year-old girl who is not studying nor working. Mrs May is a member of a medical aid scheme.

She has two options to choose from.

Study the information on ANNEXURE A to answer the questions below.

1.1.1 Identify the salary row to which Mrs May belongs for both medical aid options. (2)

1.1.2 Calculate the difference in contribution for the whole family between the two medical aid options for a month. (6)

1.1.3 If she chooses Emerald and R2 530 is deducted from her salary, calculate the percentage that the government subsidises her for medical aid. Round your answer to one decimal place.

**Note: Government subsidy is the difference between medical aid amount and the amount deducted from salary.** (3)

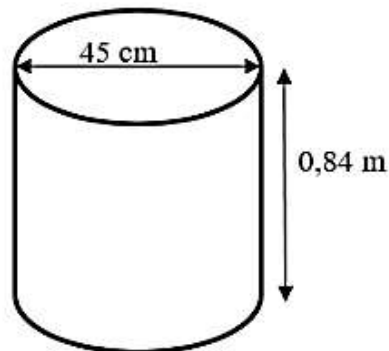
1.1.4 The medical aid scheme has a fitness exercise programme. What is the importance of such a fitness programme? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2

Mrs May had an initiation ceremony for her son in December 2015. They had traditional beer brewed in big cylindrical containers with dimensions as shown below:



Containers need to be 70% full of beer to allow space for fermentation.

**Note:** Fermentation is a process occurring during brewing of the traditional beer which releases gas in the form of bubbles on top of the beer.

You may use the formulae:

**Volume** =  $\pi \times \text{radius}^2 \times \text{height}$

**Area of rectangle** = length  $\times$  breadth

**Area of circle** =  $\pi \times \text{radius}^2$

Where  $\pi = 3,142$

1.2.1 Calculate the volume of the traditional beer in 1 container in cubic meters ( $\text{m}^3$ ). (4)

1.2.2 Mrs May has a store room which has a length of 2 m and a width of 1,5 m. She claims that she is able to pack 13 big beer containers on the floor of her store room. Verify, showing all the necessary calculations, whether her claim is valid. (6)

1.3

Mrs May is planning for her son's graduation and decides to invest her bonus money for two years. She invests the money in an institution offering interest that is compounded annually at an interest rate of 5,8% for the first year and 6,5% for the second year.

**Note:** Annual bonus money is a 13<sup>th</sup> cheque which is equal to the monthly salary without deductions

**Note:** She only used one year's annual bonus

**Note:** Her annual income is R336 000 after she received an increase of 6,5%

1.3.1 Calculate her annual income before she received the increase. (3)

1.3.2 Calculate how much money will be paid out to her after the two-year period. (5)

[31]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

## QUESTION 2

2.1 In 2015 people were employed to develop reading material for schools. They were paid according to the number of pages they developed. Rates and information on remuneration are given in ANNEXURE B.

They spent 7 days developing the material. They travelled daily to and from the centre where they worked. They worked 10 hours per day.

2.1.1 One of the employees developed 20 pages in 10 hours. Show, using calculations, whether the employee was within the norm time, or not. (4)

2.1.2 Calculate the percentage increase in rate of developing material from 2013 to 2015. (3)

2.1.3 The manager is convinced that the R130 000 that he has budgeted for 10 employees to each develop 161 pages in seven days will be R4 000 more than the amount needed.

**Note:** Two employees live a distance of 35 km from the centre; three live 25 km from the centre; and the rest live 12 km from the centre.

Verify, showing all necessary calculations, whether the manager's statement is valid. (10)

2.2 Mr Reeva, a 58-year old USA citizen earning \$350 500 taxable income per year. The USA Tax Table is shown on ANNEXURE C.

2.2.1 Calculate how much tax Mr Reeva is paying per month. (5)

2.2.2 Mr Reeva is claiming that if his earnings were taxed in South Africa, he would be paying more tax per month. Use the South African Tax Table shown in ANNEXURE C to verify whether his statement is valid.

Given that \$1 = R14,11 (7)

2.2.3 From the Tax Tables, it is evident that the more you earn, the more tax you pay. Mr Reeva claims that this is unfair. Support his claim by giving ONE reason. (2)

2.3 Two friends are travelling from East London to Uitenhage which is a distance of 311 km. They leave East London at 06:00. They stop at Nanaga for 30 minutes for refreshments.

If the two friends reach Uitenhage at 08:55, show with calculations whether they did not exceed the average speed limit of 120 kilometres per hour.

You may use the formula:  $\text{Speed} = \frac{\text{Distance}}{\text{Time}}$  (6)

2.4 Marks are recorded and analysed after marking has been completed and marks for 2 schools are compared. In School A, the maximum mark is 87 and the minimum mark is 28 while the mean mark is 43. In School B the maximum mark is 76, the minimum mark is 53 with a mean mark of 56.

Which school has performed better? Give TWO reasons for your choice. (5)

[42]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### QUESTION 3

3.1 ANNEXURE D shows a strip chart from Pretoria to Windhoek.

A couple with two adult children (both females), from Johannesburg, plan a holiday and decide to go to Windhoek. On their way to Windhoek they visit the Moremi Wildlife Reserve in Maun. When travelling to Maun they turn right at Lobatse and take the A1 route and then pass through Nata. On the first day they get accommodation at Moremi Wildlife Reserve and the next day proceed to Windhoek via Ghanzi.

Use the strip chart on ANNEXURE D to answer the following questions.

3.1.1 How many kilometres do they travel to Windhoek? (5)

3.1.2 Apart from route A1, which other routes do they travel on from Johannesburg? Also, give the names of the countries where these routes are found. (4)

3.1.3 At Moremi Wildlife Reserve there are two accommodation options:

**Option 1:** Self-catering chalets for 4 people at R1 550 per chalet per night

**Option 2:** A bed and breakfast at R550 per person sharing (with breakfast)

The couple stated that if they choose **Option 1** and decide to have breakfast at a restaurant at R95 per person, they will be able to save R300.

Show, with the necessary calculations, whether their statement is true, or not. (5)

3.1.4 At Moremi Wildlife Reserve there are 5 self-catering units accommodating 4 people and 3 self-catering units accommodating 6 people at extra cost if there are only 4 people.

If all self-catering units are still available when they are making their booking, determine the probability of getting a self-catering unit at no extra cost. Give your answer to the nearest percentage. (4)

3.1.5 Mr and Mrs Smith, who are friends to the couple, are also on their way from Johannesburg to Windhoek. They take a different route and spend a night at Sun City. From Sun City they proceed to Tshane to visit some friends. After their visit, they travelled on the A2 route to Windhoek.

The two families are claiming that the difference between the distance travelled by the couple with the two adults and the distance travelled by Mr and Mrs Smith, is 463 km. Verify, with the necessary calculations, whether the statement is valid. (5)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

3.2 The table in ANNEXURE E has information on the performance of Grade 12 learners in some of the most popular subjects from 2013 to 2016.

3.2.1 Describe the trend of the percentage achieved in Mathematical Literacy from 2013 to 2016. (2)

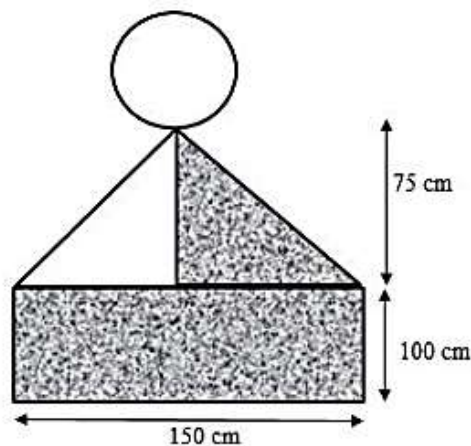
3.2.2 Explain how the percentage achieved for Mathematics differ from the percentage achieved for Mathematical Literacy for the period 2013 to 2016. (2)

3.2.3 In January 2017 when the Minister of Education, Angie Motshekga, announced the 2016 matric results, she mentioned that in 2016 the enrolment for Mathematics increased from 263 903 to 265 810 and that of Mathematical Literacy decreased from 388 845 to 361 865. Write the difference in the Mathematics enrolment to the difference in the Mathematical Literacy enrolment as a ratio. (3)

[30]

#### QUESTION 4

4.1 People in Mrs. Sibeko's home village like colourful decorations. They have decided to decorate the outside walls of their community hall as shown in the diagram below.



##### Notes:

- Dimensions are as indicated
- Circumference of the circular part is 157,1 cm
- The two triangles are equal.

You may use the following formulae:

Area of rectangle = length  $\times$  width

Circumference of circle =  $2 \times \pi \times$  radius

Area of triangle =  $\frac{1}{2} \times$  base  $\times$  height

Area of circle =  $\pi \times$  radius<sup>2</sup>; where  $\pi = 3,142$

4.1.1 Calculate the diameter of the circular part of the decoration in metres. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 4.1.2 If the wall is 4 m high and the decorations are at equal distances from the top and the bottom, calculate the distance that the decoration is from the top and the bottom of the hall in metres. (4)

- 4.1.3 The decoration is painted using red paint for the shaded part and white paint for the unshaded parts. Paint is sold in 5 litre tins at R499 for the white paint and R505 for the red paint. Spreading rate for paint is  $8 \text{ m}^2$  per litre. Two coats of each colour will be needed and 15 decorations will be painted.

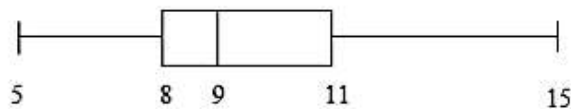
Mr. Sibeko stated that the amount of money that they will spend for red paint will be twice the amount of money that they will spend for white paint. Verify, with the necessary calculations, whether this statement is valid or not. (12)

- 4.2 The map in ANNEXURE F is showing maximum temperatures for some towns and cities in South Africa and neighbouring countries.

- 4.2.1 What is the general direction of Polokwane from Calvinia? (2)

- 4.2.2 If the mean for the maximum temperature of all the towns and cities shown on the map is  $26,762 \text{ }^\circ\text{C}$ , calculate the modal value B for the 5 towns and cities represented by B on the map. (4)

- 4.2.3 The box and whisker diagram represents the minimum temperatures:



Calculate the difference between the interquartile ranges of the minimum temperatures and maximum temperatures. (7)

- 4.2.4 The box-and-whisker values for the minimum temperatures have already been plotted in ANSWER SHEET 1. Plot the box-and-whisker values for the maximum temperatures to complete a compound bar graph on the same ANSWER SHEET. (6)

- 4.2.5 Refer to the maximum temperatures as shown on the map and calculate the probability of having a temperature equal to or more than  $28 \text{ }^\circ\text{C}$ . Give your answer as a decimal fraction to three decimal places. (3)

- 4.2.6 The actual distance between East London and Cape Town is 1 045 km. Calculate the scale used on the map and write it in the form 1 : ... Give your answer to the nearest million. (5)

[47]

TOTAL: 150

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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### ANNEXURE A – QUESTION 1.1

Table showing how much to pay for two different medical aid options in 2016:

**EMERALD:**

Salary row	R 0 – R 11 053	R 11 053 – R 19 089	R 19 089+
Member row	R 1 996	R 2 210	R 2 477
Adult row	R 1 416	R 1 583	R 1 761
Child row	R 731	R 820	R 914

**ONYX:**

Salary row	R 0 – R 11 053	R 11 053 – R 23 551	R 23 551+
Member row	R 3 193	R 3 322	R 3 587
Adult row	R 2 271	R 2 351	R 2 362
Child row	R 949	R 1 030	R 1 149

[Source: [www.gems.gov.za](http://www.gems.gov.za)]

**Notes:**

- Salary row reflects monthly salary before tax and other deductions.
- Member row shows how much the main member (person paying for the medical aid) has to pay.
- Adult row shows how much you pay for adult dependent.
- Child row shows how much the main member pay for child dependents (persons under the age of 21). Persons that are mentally or physically disabled, younger than 28 and still students at a recognised educational institution.

### ANNEXURE B – QUESTION 2.1

Remuneration for developing reading material:

Rates for 3 consecutive years			
Year	2013	2014	2015
Norm time (in minutes)	26	26	26
Rate for developing in Rand	147,36	138,25	169,30
Rate for transport in Rand	2,45 per km	2,64 per km	2,82 per km

**Notes:**

- Norm time = number of minutes taken to develop 1 page
- Total remuneration = amount of developing material + transport
- Amount for developing material =  $\frac{\text{norm time}}{60} \times \text{rate for developing} \times \text{number of pages developed}$
- Transport fee = rate for transport  $\times$  number of kilometres travelled

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE C – QUESTION 2.2

#### Tax Tables for Individuals:

#### American Tax Table 2015/2016 (1 March 2015 to 29 February 2016)

IF TAXABLE INCOME IS BETWEEN:	THE TAX DUE IS:
0 – \$9 225	10% of taxable income
\$9 226 – \$37 450	\$922,50 + 15% of the amount over \$9 225
\$37 451 – \$90 750	\$5 156,25 + 25% of the amount over \$37 450
\$90 751 – \$189 300	\$18 481,25 + 28% of the amount over \$90 750
\$189 301 – \$411 500	\$46 075,25 + 33% of the amount over \$189 300
\$411 501 – \$413 200	\$119 401,25 + 35% of the amount over \$411 500
\$413 201 +	\$119 996,25 + 39,6% of the amount over \$413 200

[Source: [www.incometax/p/america](http://www.incometax/p/america)]

#### South African Tax Table 2015/2016 Tax Year (1 March 2015 to 29 February 2016)

TAXABLE INCOME (R)	RATES OF TAX (R)
0 – 181 900	18% of each R1
181 901 – 284 100	32 742 + 26% of the amount above 181 900
284 101 – 393 200	59 314 + 31% of the amount above 284 100
393 201 – 550 100	93 135 + 36% of the amount above 393 200
550 101 – 701 300	149 619 + 39% of the amount above 550 100
701 301 and above	208 587 + 41% of the amount above 701 300

#### Tax Rebates in South Africa

TAX REBATE	2016	2015
Primary (younger than 65 years)	R13 257	R12 726
Secondary (65 years and older)	R7 407	R7 110
Tertiary (75 years and older)	R2 466	R2 367

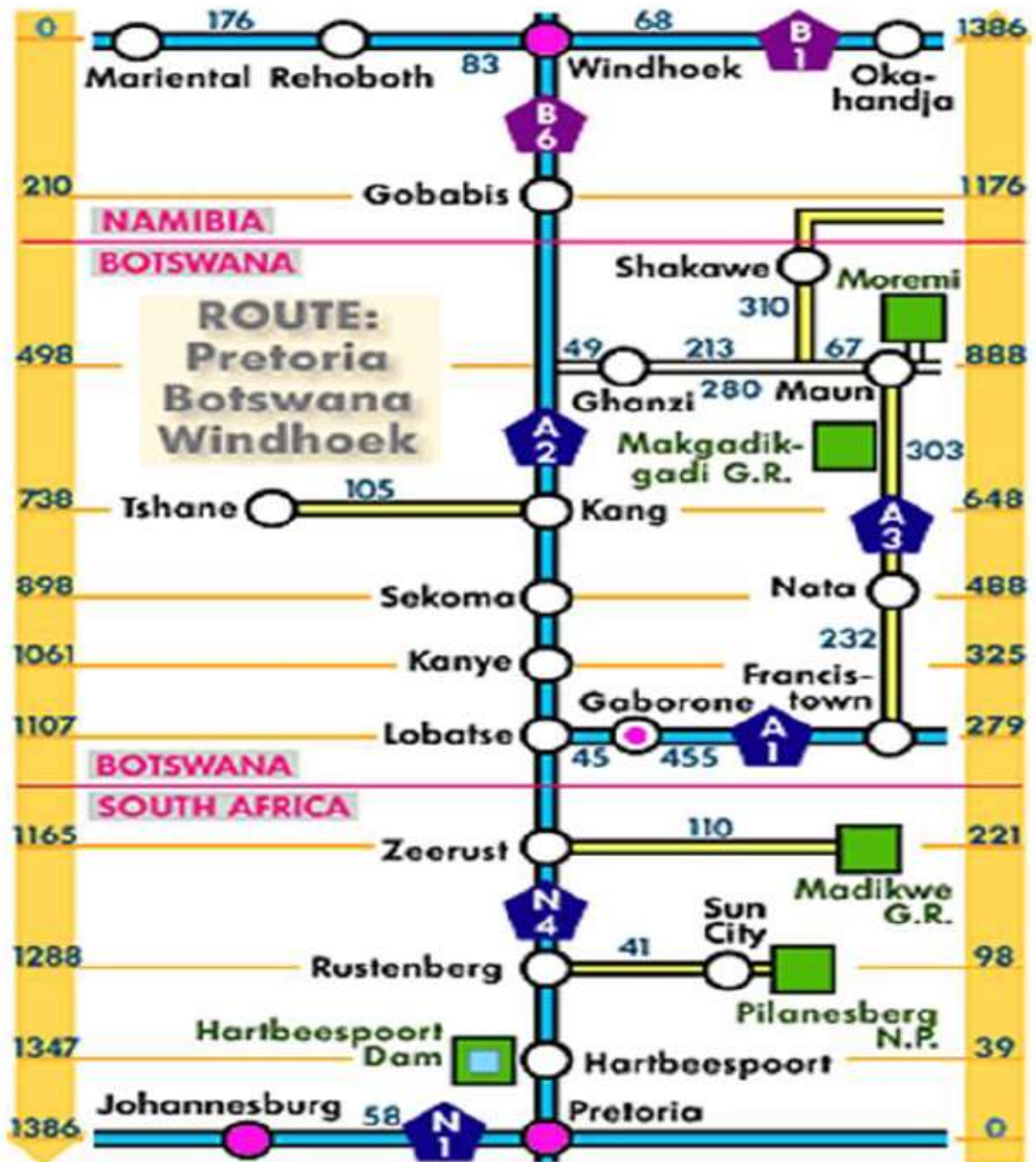
[Source: [www.sars.gov.za](http://www.sars.gov.za)]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE D – QUESTION 3.1

Strip chart map showing route from Pretoria to Windhoek:



[Source: [www.googlemaps.co.za](http://www.googlemaps.co.za)]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE E – QUESTION 3.2**

Grade 12 performance of some subjects from 2013 to 2016:

SUBJECTS	2013			2014			2015			2016		
	Wrote	Achieved at 30% and above	% achieved	Wrote	Achieved at 30% and above	% achieved	Wrote	Achieved at 30% and above	% achieved	Wrote	Achieved at 30% and above	% achieved
Geography	239 657	191 834	80,0	236 051	191 966	81,3	303 985	234 209	77,0	302 600	231 588	76,5
History	109 046	94 982	87,1	115 686	99 823	86,3	154 398	129 643	84,0	157 594	132 457	84,0
Life Sciences	301 718	222 374	73,7	284 298	209 783	73,8	348 076	245 164	70,4	347 662	245 070	70,5
Mathematical Literacy	324 097	282 270	87,1	312 054	262 495	84,1	388 845	277 594	71,4	361 865	257 881	71,3
Mathematics	241 509	142 666	59,1	225 458	120 523	53,5	263 903	129 481	49,1	265 810	135 958	51,1
Physical sciences	184 383	124 206	67,4	167 997	103 348	61,5	193 189	113 121	58,6	192 618	119 427	62,0

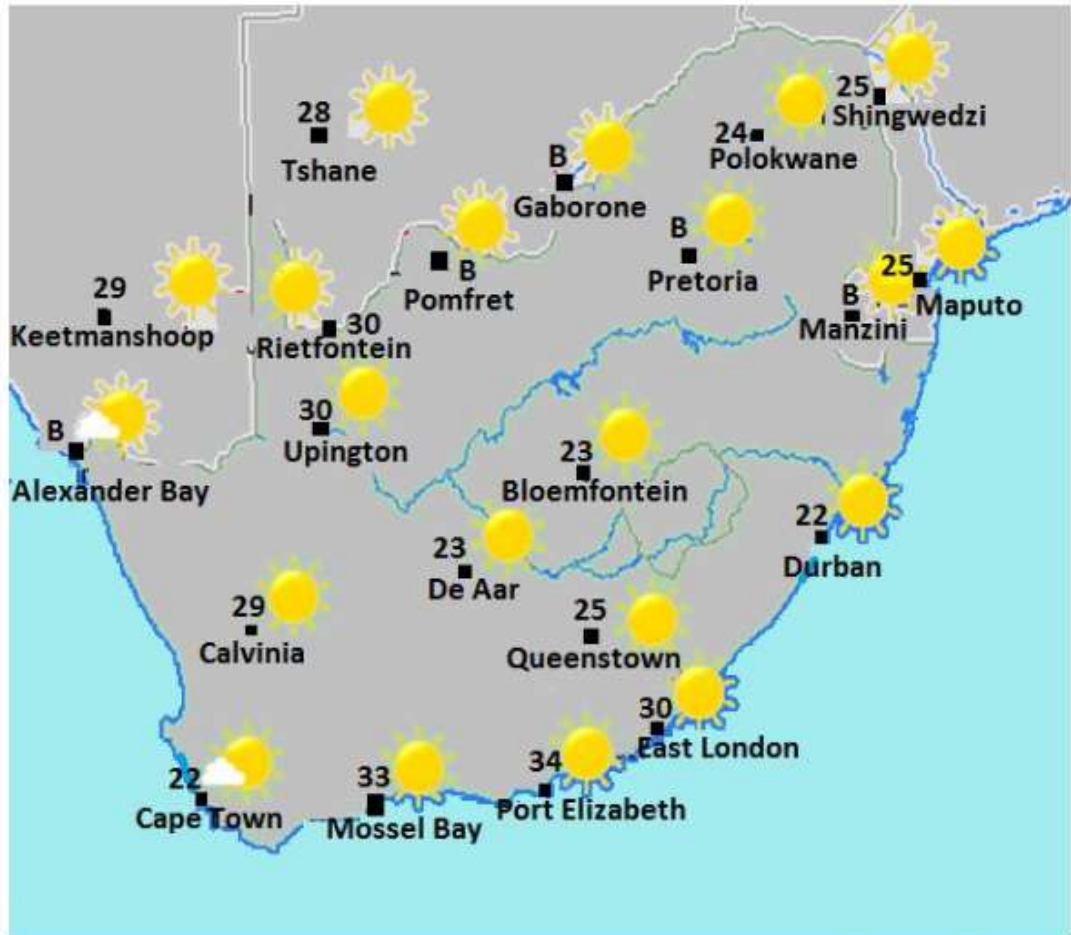
[Source: [www.education.gov.za](http://www.education.gov.za)]

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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE F – QUESTION 4.2

Map with the maximum temperatures on 11 August 2016:



[Source: [www.weathersa.co.za](http://www.weathersa.co.za)]

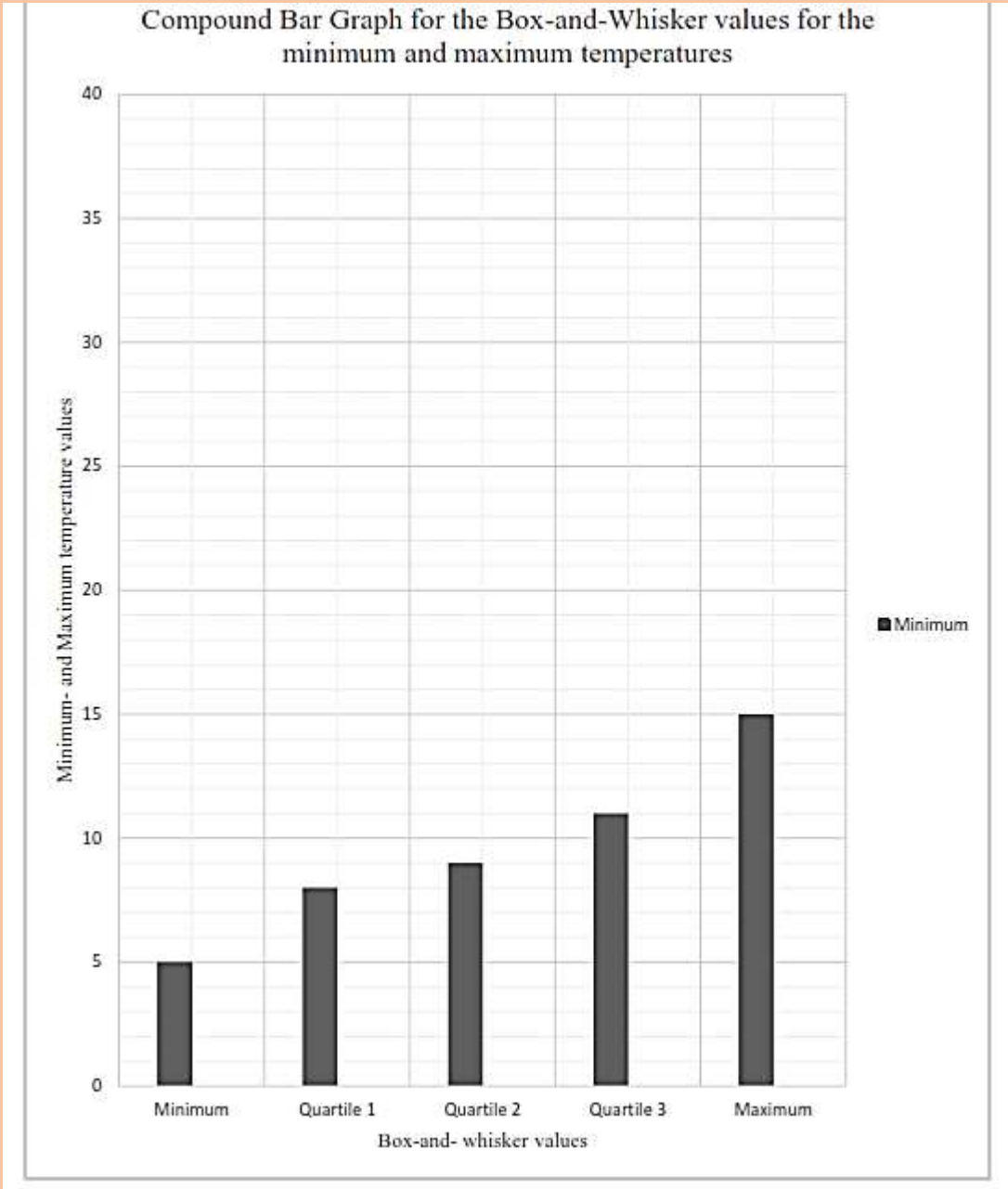
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANSWER SHEET 1 FOR QUESTION 4.2.4**

**NAME:** \_\_\_\_\_

**GRADE 12:** \_\_\_\_\_



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 1

- 1.1 ABSA Bank recorded the average South African house price in 1981 as R50 143,00. By 2010, this average house price had risen to R1 029 331,00. Calculate the percentage by which the price of an average house had increased. Round your answer to the nearest whole number. (5)
- 1.2 The average house price, along with the projected average house price for the first 21 years of this century, is shown on Annexure 1. Refer to the graph on Annexure 1 in order to answer the questions that follow.
- 1.2.1 Mary was in Grade 8 in 2005. She passed every grade and went on to study at university for 4 years immediately after her Matric year. The year after graduating (passing her course at university), Mary investigated the possibility of buying a house. State both the year and the average price of a house (rounded to the nearest hundred thousand) in that year. (3)
- 1.2.2 Determine which range in house prices is greater: from 2000 to, and including, 2010 or from 2011 to, and including, the projected price of 2020. Motivate your answer showing all calculations. (5)
- 1.2.3 Determine the median price of a house from 2005 to, and including, 2014. (3)
- 1.2.4 During which year would the value of your house have doubled if you bought a house for the quoted average price in 2004? (2)
- 1.2.5 Calculate the projected mean house price from 2016 to, and including, 2020. (4)
- 1.3 Refer to Annexure 2 in order to answer the questions that follow.
- 1.3.1 Annexure 2 shows graphs of the South African population and the average house prices in South Africa. Describe the trends in the average house prices and population figures in South Africa. (2)
- 1.3.2 Write down the approximate projected average house price and the approximate projected population for November 2047. (4)
- 1.3.3 The line showing the Average House Price appears to begin at zero. Why? (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 1.4 Annexure 3 shows a breakdown of how South Africans spend their money according to a survey done between September 2010 and August 2011.
- 1.4.1 (a) According to the data given in Annexure 3, 32% of what an average household spends is on housing, water, electricity, gas and other fuels and amounts to R30 505. Calculate the amount of their total annual expenditure. (4)
- (b) If this expenditure group (housing, water, electricity, gas and other fuels) is combined with one other expenditure group, it accounts for almost 45% of a household's annual expenses. State what the other group is. (2)
- 1.4.2 (a) Write down the percentage spent on education to percentage spent on clothing and footwear, as a ratio in its simplest form. (3)
- (b) Calculate the missing value:  
For every R1 an average household spends on Education, they spend R... on Clothing and Footwear. (3)

- 1.5 According to an informal poll done amongst South African families, the amount of money spent on groceries for a family of 3 is R54 000 per year.  
[Source: <<http://www.zaparents.com/we-spent-what-on-groceries/>>]
- The average rate of inflation over the past 3 years has been 5,17% per year.
- If the average rate of inflation remains the same for the next 3 years, show that a family of 3 can expect to pay more than R5 200 per month for groceries in 3 years' time. Show all working. (8)
- 1.6 Refer to Annexure 4 to answer the questions that follow. Write down only the missing figure for Questions 1.6.1 to 1.6.4 in your Answer Book.
- 1.6.1 In the year ..., a house costing R550 000 lay on the 95<sup>th</sup> percentile. (2)
- 1.6.2 In 1995, a house costing R100 000 lay on the ... percentile. (2)
- 1.6.3 If a house lies on the 80<sup>th</sup> percentile, this means that ... % of the houses cost more than this house. (2)
- 1.6.4 If there were a group of 20 houses in 2005, then it is safe to say that out of those 20 houses ... (a) ... house(s) would cost more than R1,2 million and ... (b) ... house(s) would cost less than R1,2 million. (4)
- 1.6.5 In 1998, even though he only paid R100 000 for his house, Pete bragged to all his friends about living in a really expensive house. By making reference to the percentiles, decide whether Pete had any reason to brag. Explain your answer. (3)

[63]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

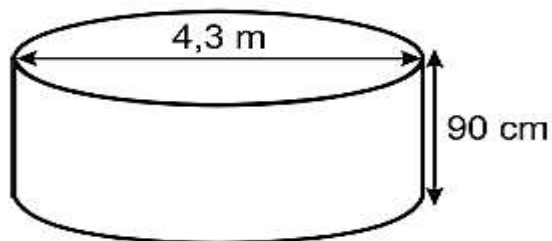
## QUESTION 2

Bongani enjoys doing DIY (Do-It-Yourself) Projects.

- 2.1 Bongani's last successful project was digging a cylindrical hole to secure a trampoline for his children.



**The hole Bongani dug**



**The dimensions of the hole he dug**



**The finished project**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Although Bongani has reused some of the excavated (dug up) sand, he still has two-thirds of the sand left over. A company is prepared to collect the sand free of charge provided it is more than  $5 \text{ m}^3$ .

2.1.1 Calculate the area of the base of the hole in square metres, rounded off to 2 decimal places.

$$\text{Area} = \pi \times r^2 \text{ where } r = \text{radius and } \pi = 3,14 \quad (3)$$

2.1.2 Determine, showing all calculations, whether there is enough sand for the company to come and collect free of charge.

$$\text{Volume} = \text{Area of base} \times \text{height} \quad (5)$$

2.2 Bongani's latest project is to build a set of shelves.

A picture of the shelves he is hoping to build is alongside. (See also Annexure 5A, Figure 1.)

The plans for the shelves, along with all of the dimensions (given in inches), are given on Annexures 5A and 5B.

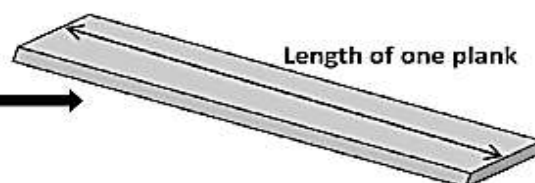
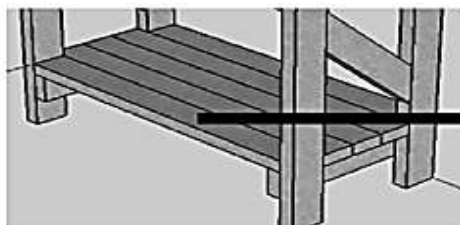
$$1'' (\text{inch}) = 2,54 \text{ cm}$$



2.2.1 Refer to Figure 2, Annexure 5A. Bongani does not want a shelf that is higher than 1,9 m. Do these shelves meet his requirements? Justify your answer by showing all working. (5)

2.2.2 To build the shelves, Bongani will use planks that are 1 m in length and just cut them to the correct size.

Calculate the total wood wasted from the 5 planks used to build the bottom shelf. Refer to Figure 3 and Figure 4 found in Annexure 5B.



(9)

2.2.3 The wood that Bongani wants to use for the shelves costs R27,53/m excluding VAT (Value Added Tax) of 14%. According to his calculations, it will cost him less than R1 000 for all the wood, including VAT.

By making use of the values given on the Answer Sheet, and by completing the missing values, determine whether Bongani is correct in his calculation. (9)

[31]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 3

Samantha and Nivaan live in London and are going on holiday to Germany and South Africa. From Frankfurt in Germany, they will land at Cape Town International Airport and, after spending a few days in Cape Town, make their way to Johannesburg.

- 3.1 When arriving in Cape Town, they need to exchange their remaining euros (from Germany) and some pounds (from England) into South African rands. Calculate the amount of South African rands they will have to spend if they land in Cape Town with 180 euros and 800 British pounds. Use the following exchange rates:

$$\begin{aligned}1 \text{ euro} &= \text{R}13,56 \\1 \text{ British pound} &= \text{R}17,13\end{aligned}$$

(6)

- 3.2 The map below shows the direct route, as the crow flies, between Cape Town and Johannesburg.



If the distance, as the crow flies, between Cape Town and Johannesburg is 1 237 km, determine the scale, **to the nearest million**, of the map in the form of 1: ...

(5)

- 3.3 If they drive from Cape Town to Johannesburg, they can expect to drive approximately 1 397 km in 15.5 hours.

- 3.3.1 Determine their average speed for the trip. Round your answer to the nearest whole number.

$$\text{Distance} = \text{Speed} \times \text{Time}$$

(4)

- 3.3.2 According to the *Arrive Alive* website, a driver should have a 15-minute break after every 2 hours. If Samantha and Nivaan rest as they should, how long will the journey take them if the originally estimated 15,5 hours did not include the breaks?

(6)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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3.4 Samantha and Nivaan also consider taking the train from Cape Town to Johannesburg. They will leave Cape Town on a Thursday. The train schedule is shown on Annexure 6.

Samantha is not excited to take the train because she says it will take twice as long as the car trip. By calculating the duration of the journey by train, determine whether she is correct. (3)

3.5 If Samantha and Nivaan make their decision to get to Johannesburg (during the month of April) based purely on cost, which method of travel should they use? Justify your answer by showing the cost of each option.

The following conditions must be taken into consideration:

They can borrow a friend's car but must pay for their own petrol. They will get the car with a full tank of petrol, but Samantha and Nivaan must leave the car with a full tank of petrol in Johannesburg.

- The average fuel consumption of the car is 5,8 ℓ/100 km.
- The average price of petrol is R11,07/ℓ.
- Tolls from Cape Town to Johannesburg total R138,50.

(12)  
[36]

#### QUESTION 4

4.1 Isabel is buying a lounge suite and sees the following advertisement:



[Source: Highway Mail; House and Home, February 2015]

Isabel does not have the cash to purchase the lounge suite so is interested in the payment terms offered by the shop.

4.1.1 Does the **Total Payable** amount include the deposit? Substantiate your answer. (4)

4.1.2 If Isabel buys this lounge suite on hire purchase, how much extra (in rands) does she end up paying? (4)

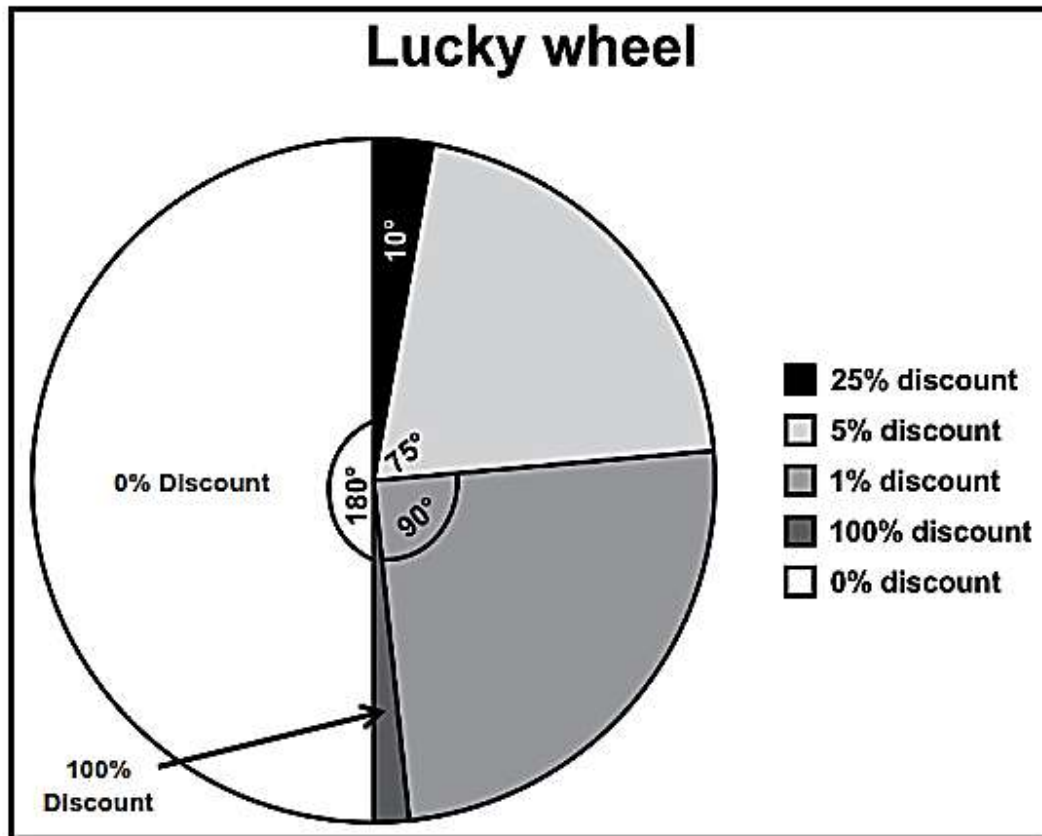
4.1.3 Name one advantage and one disadvantage of buying an item on hire purchase. (2)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

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- 4.2 Whilst buying her lounge suite, Isabel has the opportunity to spin a 'Lucky Wheel', and in so doing, she may get a discount on the cost of the lounge suite.

The wheel looks as follows:

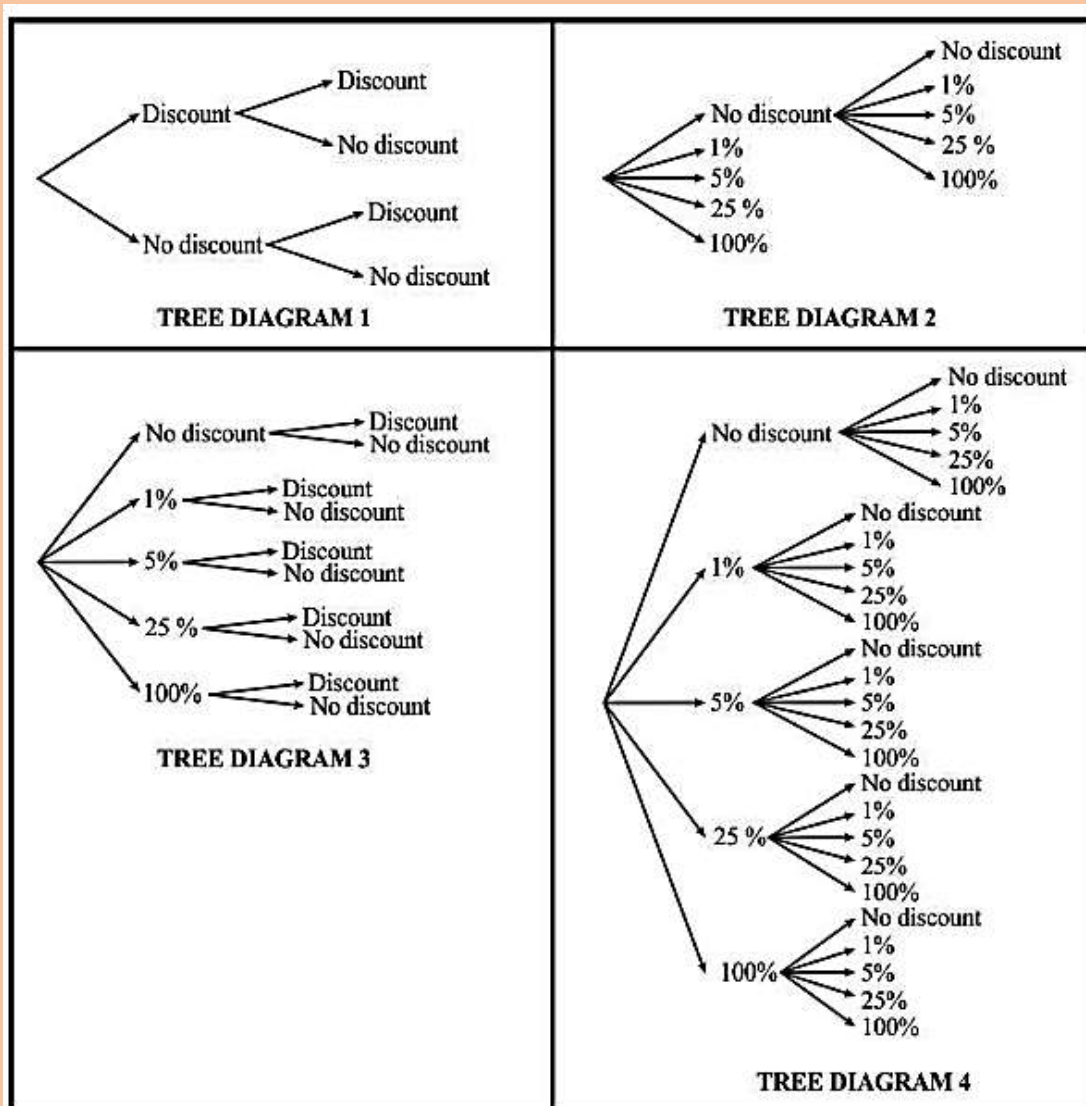


- 4.2.1 If there are  $360^\circ$  in a circle, determine the probability of Isabel getting a 100% discount for her purchase. Write the probability as a fraction in its simplest form. (4)

- 4.2.2 (a) As Isabel receives no discount on her first spin, she may spin the wheel again. Which tree diagram below accurately represents her scenario?

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



(2)

(b) Isabel has a 50% chance of getting no discount. Determine the probability of Isabel getting no discount on both her spins.

(4)  
[20]

**Total: 150 marks**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE 1 QUESTION 1

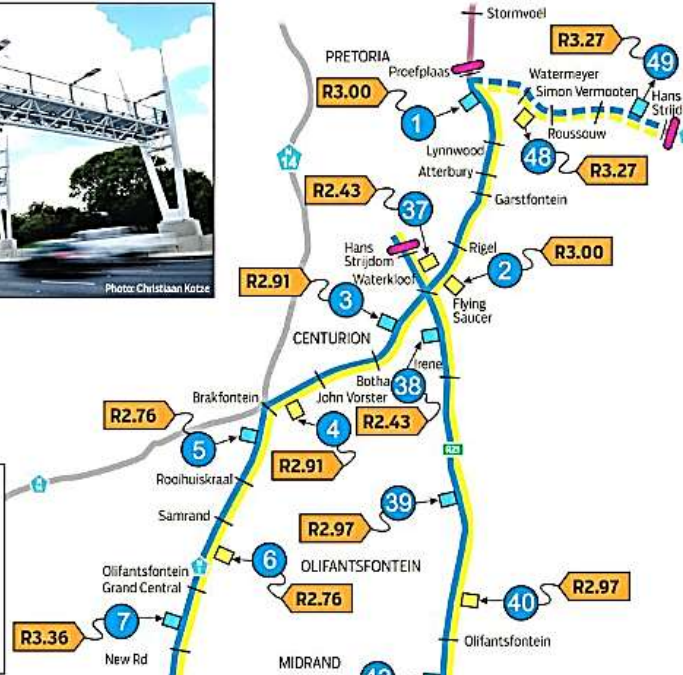
# What e-tolls will cost you\*

\* Registered e-toll user of a normal vehicle (also known as a light vehicle)



You pay **31% less** with an e-tag

<b>R0.00</b>	Entry points to Gauteng's toll roads
Tariff for a light vehicle with an e-tag	Existing Sanral-financed toll roads
Existing toll plazas	Existing BOT toll projects
1 Toll portal	Interchanges



- Toll gantries**
- Barbet (N1-21)
  - Mossie (N1-21)
  - Indlazi (N1-21)
  - Pikoko (N1-21)
  - Ivusi (N1-21)
  - Flamingo (N1-21)
  - Ihobe (N1-21)
  - Sunbird (N1-20)
  - Tarentaal (N1-20)
  - Blouvalk (N1-20)
  - Owl (N1-20)
  - Pelican (N1-20)
  - King Fisher (N1-20)
  - Ukhozi (N1-20)
  - Fiscal (N1-20)
  - Stork (N1-20)
  - Ilowe (N1-20)
  - Leeba (N3-12)
  - Ibis (N3-12)
  - Kiewiet (N3-12)
  - Kwikkie (N3-12)
  - Starling (N3-12)
  - Roovink (N3-12)
  - Mpshe (N3-12)
  - Oxpecker (N3-12)
  - Phakwe (N12-18)
  - Thaha (N12-18)
  - Lenong (N12-18)
  - Legwaba (N12-18)
  - Leorie (N12-19)
  - Gull (N12-19)
  - Head (N12-19)



- Ilanda (N12-19)
- Bee-eater (N12-19)
- Hadeda (R21-1)
- Ntsu (R21-1)
- Heron (R21-1)
- Bluecrane (R21-1)
- Swael (R21-2)
- Letata (R21-2)
- Swan (R21-2)
- Weaver (R21-2)
- Hornbill (R21-2)
- Ugaga (N12-19)
- Inkoku (N4-1)
- Penguin (N4-1)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE 2 QUESTION 1.6



**TRANSACTION REPORT**

SANRAL – Violation Processing Centre (VPC)  
Private Bag X164  
Centurion  
0046  
VAT No.: 4650258108  
Tel / Fax: 0800 SANRAL (726 725)  
e-mail: info@sa-etoll.co.za  
Website: www.sanral.co.za

VPC Account ID	1058044	VPC Tax Invoice Ref No	804605
Vehicle Licence Plate Number		Customer VAT No	N/A
Invoice Date	2013/12/23	Identification	RSA ID document
E-mail	N/A	Period	2013/12/04 to 2013/12/12

Dear John

Your e-toll VPC transaction report below lists all the outstanding transactions for the noted period.

e-tag No.	N/A	Vehicle Glass Registered	N/A
-----------	-----	--------------------------	-----

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



The images above are relating to your transaction details.

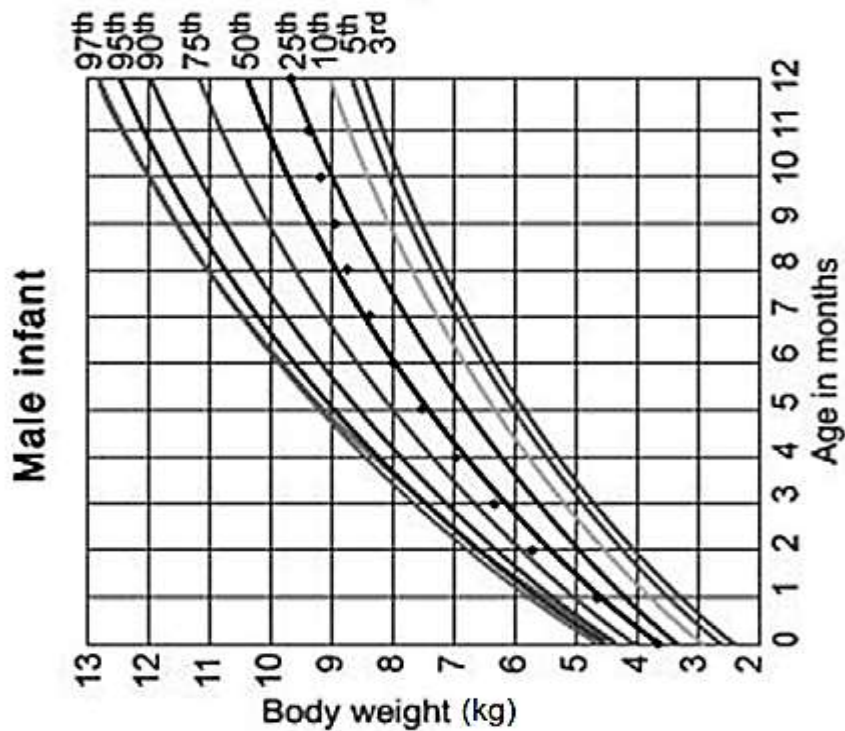
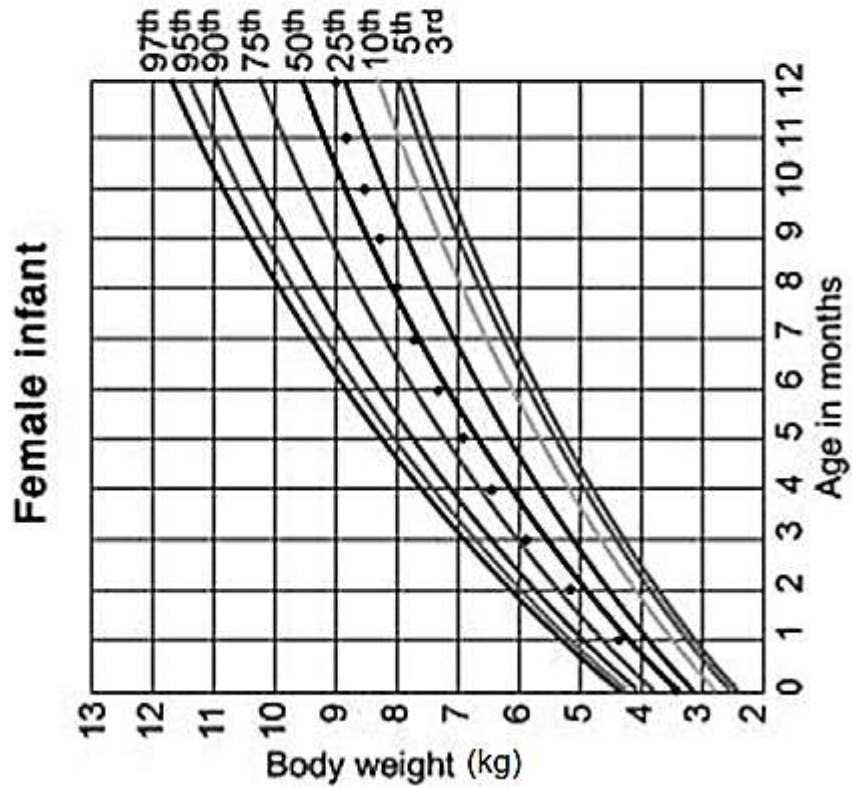
Transaction Number	Transaction Date & Time	Toll Agency	Toll Point Detail
787720327	2013/12/04 11:25:00 AM	GORT	Toll Transaction N3:T 24: Mpshe
786925154	2013/12/04 11:28:43 AM	GORT	Toll Transaction N3:T 22: Starling
786927060	2013/12/04 11:32:46 AM	GORT	Toll Transaction N3:T 20: Kiewlet
786939104	2013/12/04 11:36:08 AM	GORT	Toll Transaction N3:T 18: Leeba
786947591	2013/12/04 11:39:44 AM	GORT	Toll Transaction N3:T 10: Blouvalk
799942541	2013/12/04 08:59:20 AM	GORT	Toll Transaction N3:T 9: Tarentaal
799925027	2013/12/04 09:03:21 AM	GORT	Toll Transaction N3:T 19: Ibis
799903535	2013/12/04 09:07:05 AM	GORT	Toll Transaction N3:T 21: Kwikkie
799956171	2013/12/04 09:11:27 AM	GORT	Toll Transaction N3:T 23: Rooivink
799980933	2013/12/04 09:14:51 AM	GORT	Toll Transaction N3:T 25: Oxpecker

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### ANNEXURE 3 QUESTION 3.1

\*The dots represent an average growth rate.





Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_


**ANNEXURE 4 QUESTION 5**

**2014 FIESTA FORD 1.6 TREND 4DR POWERSHIFT**

<b>Insurer</b>	<b>Premium</b>	<b>Excess</b>
 budget insurance company MEDIUM EXCESS	R 1 911,05 per month	R7430 basic excess
 budget insurance company	R 2 047,35 per month	R4430 basic excess
 dialdirect simple smart insurance Medium Excess	R 2 100,64 per month	R7180 basic excess
 auto general car   motor   business   life insurance	R 2 216,84 per month	R4180 basic excess
 dialdirect simple smart insurance	R 2 255,59 per month	R4180 basic excess

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

	R 2 333,94 per month	R3930 basic excess
	R 2 372,41 per month	R4180 basic excess
 1st for women	R 2 380,75 per month	R4180 basic excess
	R 2 394,42 per month	R0 basic excess

The quotes presented above, are based on limited information, provided by you on the electronic equote form. The quotes are therefore only illustrative and not a binding offer. The quotes are subject to change, based upon the verification and further consideration of more comprehensive risk related information that you will be required to disclose, when you agree to the insurer or broker contacting you.

[Source: <www.hippo.co.za>]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**MAPS ,MODELS AND OTHER REPRESENTATIONS**

REVISION ACTIVITY PAPER 2

WEMBLEY SEATING PLAN



- 1.1. Give the general direction of seat 520 with respect to the stage. (2) L1
- 1.2. Give a reason why tickets on level 1 are more expensive than the one on the floor standing, except the fact that the spectators will be on their feet for the entire show. (2) L4
- 1.3. Yolanda has been accompanied by her parents and 2 brothers. The parents bought the tickets for seats 212 and 213, while the 2 brothers were on the floor standing. Determine the total cost of their tickets if  $R1 = \text{£}0.0442$ . (4) L3
- 1.4. Yolanda's parents were invited to join her on stage as she was the universal winner. Describe the route they should use to get to the stage. (5) L2

[13]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**Annexure B** is part of the map of South Africa. Use it to answer the questions that follow:

2.1 Mokgadi works as projects consultant for DR ENGINEERING Co. Ltd based in Melmoth as. She is from Standerton but due to work commitments, she stays in Melmoth. However every weekend and on public holidays when she is not working she travels back to Standerton. On one weekend, Mokgadi drove her car from Melmoth to Standerton.

- |   |     |    |
|---|-----|----|
| 2.1.1 Determine one set of route that Mokgadi can use to travel to Standerton from Melmoth using the R66 to join the N2   | (3) | L3 |
| 2.1.2 Identify two towns on the route mentioned above   | (2) | L1 |
| 2.1.3 Write down the relative position of Melmoth from Ermelo.  | (2) | L2 |
| 2.1.4 Determine the scale of the map if the actual driving distance from Melmoth to Standerton using the R66 to connect with the N2 and R39 is given as 351 km. | (4) | L3 |

2.2 Mokgadi left Melmoth at 09:06 a.m. for Standerton. She planned to stop only once on her way for 45 minutes to relax a bit before continuing. Mokgadi estimated that she would arrive in Standerton by 13:45 if she maintains a driving speed of 90 km/h.

- |   |     |    |
|---|-----|----|
| 2.2.1 Use the formula $\text{Time} = \frac{\text{distance}}{\text{speed}}$ to explain why it may not be possible for Mokgadi to arrive exactly at 13:45   | (6) | L4 |
| 2.2.2 Mokgadi's car has a petrol tank capacity of 30 litres which covers a range of 351 km. determine the cost of petrol per kilometre travelled if it costs 1206 cents per litre in coastal areas. | (4) | L4 |
| 2.2.3 Give at least one reason why it may not be practically possible for Mokgadi to travel the journey with a full tank of fuel  | (2) | L4 |

**[23]**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 1

- 1.1 The South African Weather Services recorded the minimum and maximum temperatures for ten towns and cities in South Africa on the 15 August 2016.

**TABLE 1: Temperatures recorded on 15 August 2016 for ten South African towns and cities.**

Temperature in degree Celsius ( $^{\circ}\text{C}$ )	Bloemfontein (Bfn)	Cape Town (CT)	Richards Bay (RB)	Johannesburg (Jhb)	Springbok (Spb)	Vryburg (Vb)	Barberton (Bbt)	Pretoria (Pta)	Polokwane (Plk)	East London (EL)
Minimum	A	10	15	6	6	0	11	9	8	11
Maximum	22	16	30	21	20	29	20	26	34	20

[Adapted source: [www.weathersa.co.za](http://www.weathersa.co.za)]

**Mean (average) minimum temperature =  $7,5^{\circ}\text{C}$**

Use the information in TABLE 1 to answer the following questions:

- 1.1.1 Calculate:

- (a) The minimum temperature A, for Bloemfontein. (4)
- (b) The median of the maximum temperatures. (3)

- 1.1.2 State whether the median or the mean would best represent the maximum temperature on the day. Justify your answer. (4)

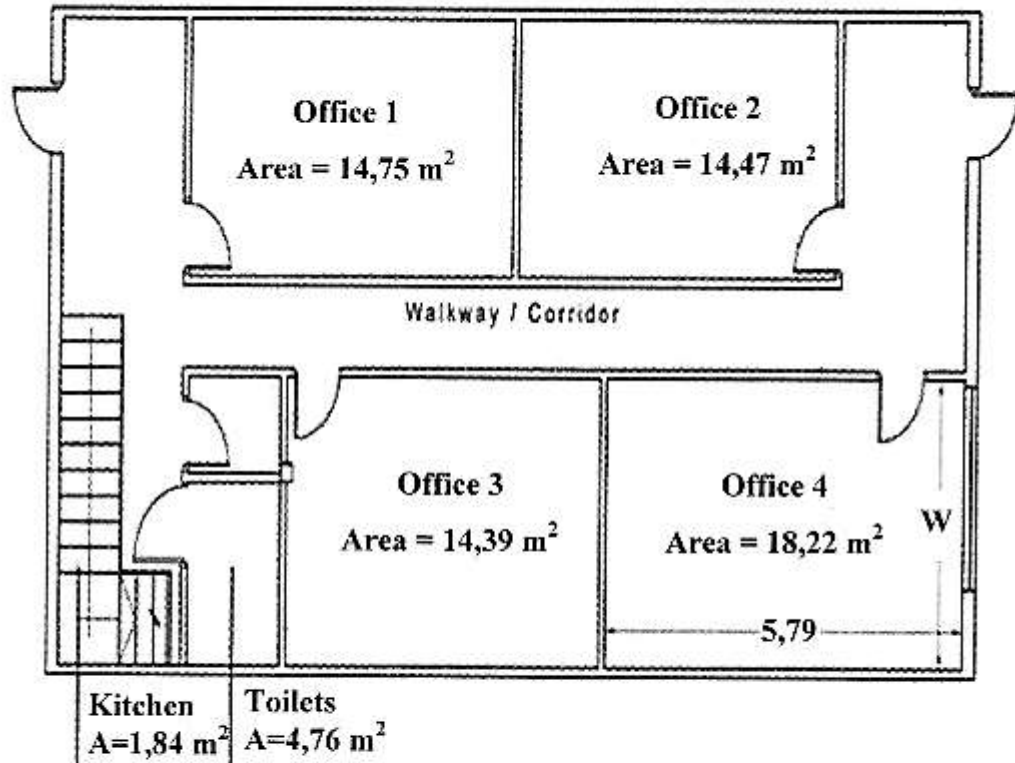
- 1.1.3 A bar graph showing the maximum temperatures of the ten towns and cities in TABLE 1 has been drawn on the ANSWER SHEET.

- (a) Draw a bar graph representing the minimum temperatures of the ten towns or cities on the same system of axes on the ANSWER SHEET. (6)
- (b) Identify the TWO towns or cities which temperatures had the greatest range on 15 August. Show all calculations. (5)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

1.2 A company intends to renovate the inside of their offices by replacing the carpets with porcelain tiles. The building is a two storey building and both floors have offices with similar dimensions. Below is the floor plan of the offices.



Information about the tiles and flooring:

- A box of tiles contains 8 tiles
- The size of a tile is 710 mm × 280 mm
- The cost of single box of tiles is R112,95

You may use the formula: **Area of rectangle = length × width**

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

Use information above to answer the following questions:

- 1.2.1 Determine  $W$ , the width of Office 4 in m, rounded to two decimal places. (3)
- 1.2.2 (a) Calculate the total area to be tiled if only the offices on both floors are to be tiled. (3)
- (b) Determine the number of boxes of tiles required to tile all these offices if 10 extra boxes are added for cutting and breakage. (7)
- 1.2.3 5 % of the cost of the tiles has to be added to the total cost of material to cover the cost of the grout, tile spacers and cement.  
The owner claimed that the cost of tiling the offices excluding labour will be met by a budget of R10 000.  
Verify, showing all calculations, his statement. (5)
- [40]

## QUESTION 2

- 2.1 Mr Basjan and his wife bought Economy Plus class return tickets to fly from Johannesburg to Rio De Janeiro during the 2016 Olympics.
- The seating plan and cost per class of ticket for the aircraft used by the Basjan couple is given on ANNEXURE A.

Use ANNEXURE A to answer the following questions:

- 2.1.1 Identify the seat where Mr Basjan was seated if another passenger used the following route to come to him:
- From seat 6B, turned right and walked down the aisle,
  - passed the toilet (on the right) and kitchen (on the left),
  - passed row 27 and found Mr Basjan in the middle seat of the next row on his left hand side. (2)
- 2.1.2 On the aircraft, the arrangement of one of the classes of seats is in such a way that some face the rear and some face the front of the aircraft.
- Identify the class of seats and the number of seats facing in each direction. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.1.3 Mr Basjan stated that the income from the sales of Economy class seats is more than  $1\frac{1}{2}$  times the income from the 1<sup>st</sup> class seats. Compare the income from the sales of all the seats in the 1<sup>st</sup> class with the income of the sales of all the seats in the Economy class ( □ ) to verify his statement. (7)

2.1.4 The couple arrived in Brazil on the afternoon of 15 August 2016 and left again on 20 August 2016. They slept at Royal Tulip Rio Sao Conrado at a cost of \$185,92/day for bed and breakfast for two persons.

Calculate the cost for the tickets plus accommodation.  
At that stage 1 USD = 14,4178 ZAR. (5)

2.2 The Basjan's trip to Rio De Janeiro was funded from the following two sources:

1. An investment of R150 000 due 01 August 2016;
2. A R50 000 loan from a bank with the following repayment conditions:

	Months		
Repayment period	12	36	60
Monthly amount	R4 792,53	R1 914,88	R 1 345,59

2.2.1 Calculate the amount available from the investment of R150 000 for three years at a compounded interest rate of 4,5% per annum. (5)

2.2.2 Determine the mean annual growth (in rand) generated from the investment for the three years. (3)

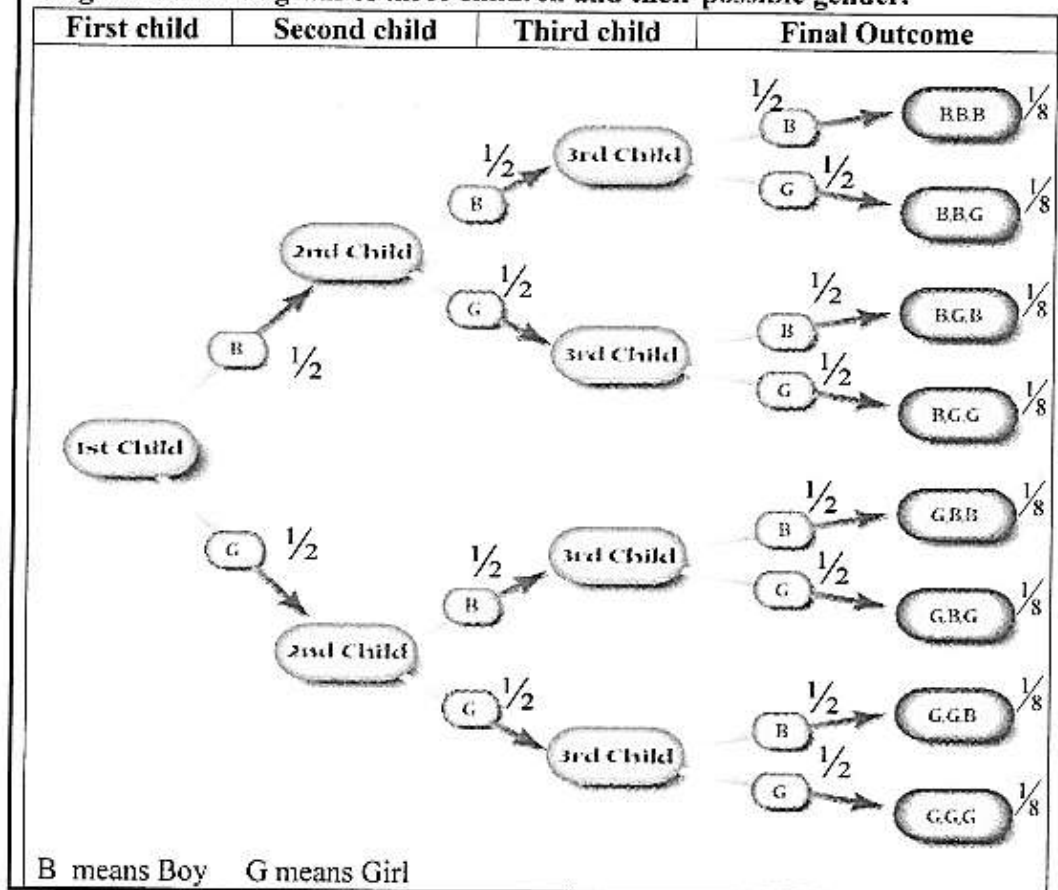
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

2.2.3 Compare and explain the effect of the repayment period on the monthly amount payable and the total amount that needs to be repaid on the loan. (4)

2.3 A family planned to have three children. The possible combination of gender for the three children that could be born is given on a tree diagram below.

**Diagram: Tree diagram of three children and their possible gender.**



Use the diagram above to answer the following questions:

2.3.1 Write down the probability (as simple fraction) that all three children can be of same gender. (3)

2.3.2 Calculate the probability (as a percentage) that a family with three children will have two boys and a girl. (3)  
[36]

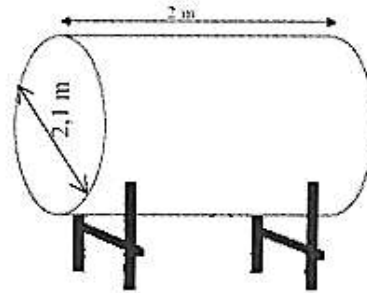
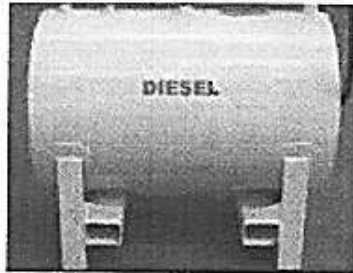
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

### QUESTION 3

- 3.1 Valois owns a diesel tank. She decides to paint both the outside surface area of the diesel tank and the stand on which it rests.  
The tank has a diameter of 2,1 m and a length of 2 m.  
The total surface area of the stand is  $1 \text{ m}^2$ .

Picture of a diesel tank:



**Information regarding the paint:**

- It takes 1 litre (ℓ) to paint  $3 \text{ m}^2$  of the outside surface area.
- The paint she uses is only sold in 1 ℓ and 5 ℓ tins.
- 1 ℓ tin of paint cost R129,95 and a 5 ℓ tin of paint costs R495,15.

Use information above to calculate the following:

- 3.1.1 The surface area (SA) of the diesel tank in  $\text{m}^2$ .

Use the formula:  $SA = 2 \times \pi \times r^2 + 2 \times \pi \times r \times h$   
where  $r$  = radius,  $h$  = height and use  $\pi = 3,142$

(4)

- 3.1.2 The quantity of paint needed to paint both the outside of the tank and the stand.

(5)

- 3.1.3 Advise Valois what is the most economical way to purchase the paint needed to paint the tank. Show all calculations.

(6)

- 3.2 The tank is used to store diesel for the generator on her farm.

- 3.2.1 Calculate the maximum capacity (volume in litres) of Valois' diesel tank.

Use the formula:

**Volume** =  $\pi \times (r)^2 \times h$ , where  $r$  = radius,  $h$  = height and  $\pi = 3,142$ .

Note: 1 litre =  $0,001 \text{ m}^3$

(4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

- 3.2.2 Valois fills the diesel tank to 85% of its capacity.  
The generator uses 70 t of diesel in 33 hours.

Calculate the volume (in litres) of diesel remaining in the tank after running the generator of continuously for 7 days. (8)

- 3.3 Valois studied the La Liga (i.e. Spain) final football leagues table for 2015/16 season in ANNEXURE B. Some data have been omitted.

**Important:**

The teams are ranked according to points accumulated whereby the top team will receive among others the highest price and the trophy. Furthermore, the bottom three teams are relegated (R). [Relegate means that a team is moved down to another league.]

The points for each team are awarded per game played as follows:

- ⇒ Win = Three points
- ⇒ Loss = Zero points
- ⇒ Draw = One point

Use ANNEXURE B and information above to answer the following questions:

- 3.3.1 Write down and USE a FORMULA in terms of points accumulated and number of games drawn or won to find the value of  $Z$ .

**Formula:** Points accumulated = ... (3)

- 3.3.2 Determine the number of matches won by Atletico Madrid during 2015/16. (3)

- 3.3.3 Critique the following statements by stating whether it is TRUE or FALSE and give a reason for your answer:

a) All the teams in the top half of the league have more goals for than goals against. (2)

b) If the relegation rules were changed to the teams losing the most games will be relegated, then Rayo Vallecano would not be relegated. (2)

- 3.3.4 Express the probability (as a decimal fraction) of randomly picking a team from La Liga with a goal difference bigger than 30. (3)

[40]

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

#### QUESTION 4

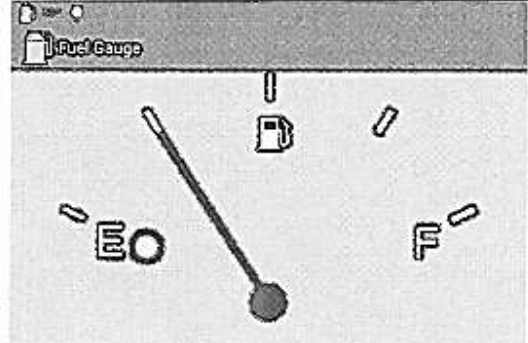
- 4.1 A 45 year old Simanga earns an annual taxable income of R666 142. He is contributing to a registered medical scheme for the following:
- himself
  - 2 parents
  - 2 parents in-laws
  - 2 children

Note: every income earner in the Republic of South Africa (RSA) must pay a certain amount to South African Revenue Services (SARS) according to the formula as presented on ANNEXURE C.

Use ANNEXURE C and information above to answer the following questions:

- 4.1.1 Explain the effect of the Medical Scheme Fees Tax Credits on individual's normal tax. (2)
- 4.1.2 Determine Simanga's monthly benefit value from the Medical Scheme Tax Credit. (3)
- 4.1.3 Simanga claims his annual tax due is 30% of his annual taxable income. Verify the statement. (11)

- 4.2 Simanga wants to undertake a trip with his car. He noticed that the fuel gauge indicated that the petrol tank had only a  $\frac{1}{4}$  of its capacity petrol left in the tank. He decided to fill it up to capacity.

Information relating to the petrol tank and the price of petrol:	Picture of the fuel gauge
<ul style="list-style-type: none"><li>• The capacity of the petrol tank is 45 litres</li><li>• Petrol cost R12,96 per litre at the time of trip</li></ul>	

Determine the cost of topping up the petrol tank of Simanga's car. (4)

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

4.3 Simanga used the strip map of the route from East London to Harrismith on ANNEXURE D while planning his trips around the Free State, Eastern Cape and Lesotho.

4.3.1 Place the route part description below in the correct order for a journey from Bethlehem to the Tussen-die-Riviere Game Farm.

Key	Route part description
A	Turn left into N1 pass Bloemfontein
B	Then travel 56 km to the destination
C	Turn right at Smithfield
D	Travelling along N5 in a westerly direction

(4)

4.3.2 Simanga travelled from Maseru via Bethlehem to Winburg at an average speed of 90km/h. After approximately 2 hours 5 minutes he stopped in a small town.

Determine the town where he stopped.

You may use the formula:

$$\text{Distance} = \text{Speed} \times \text{Time}$$

(4)

4.3.3 Show through calculations, using the distances on the left and righthand side of the strip chart, that the plotted point found between Queenstown and Aliwal North along N6 is approximately 20 km from Aliwal North.

(4)

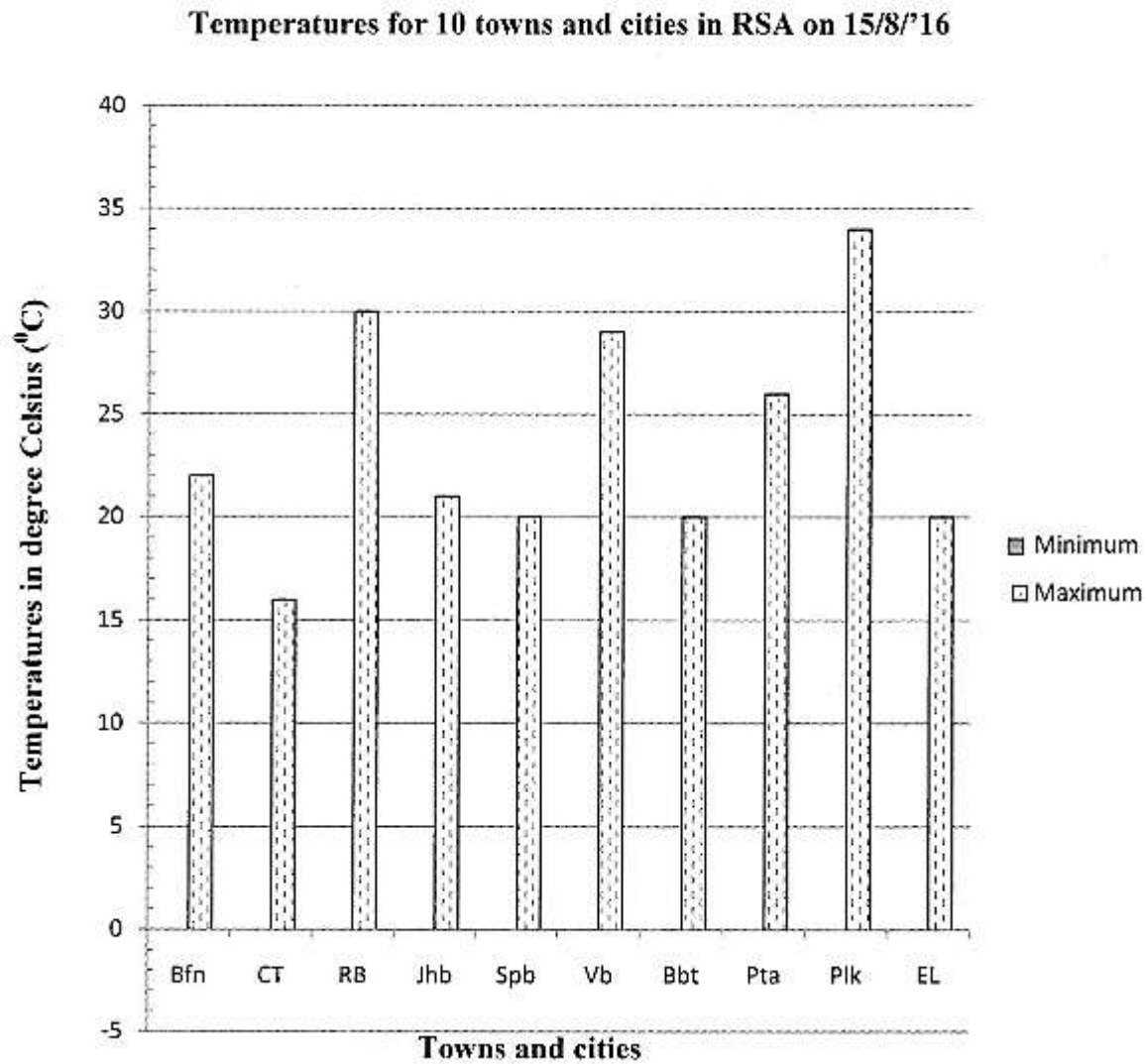
4.3.4 Measured directly from the strip map, the distance between Umtata and East London is shorter than the distance in real life between Grahamstown and East London. Explain with a reason.

(2)

[34]

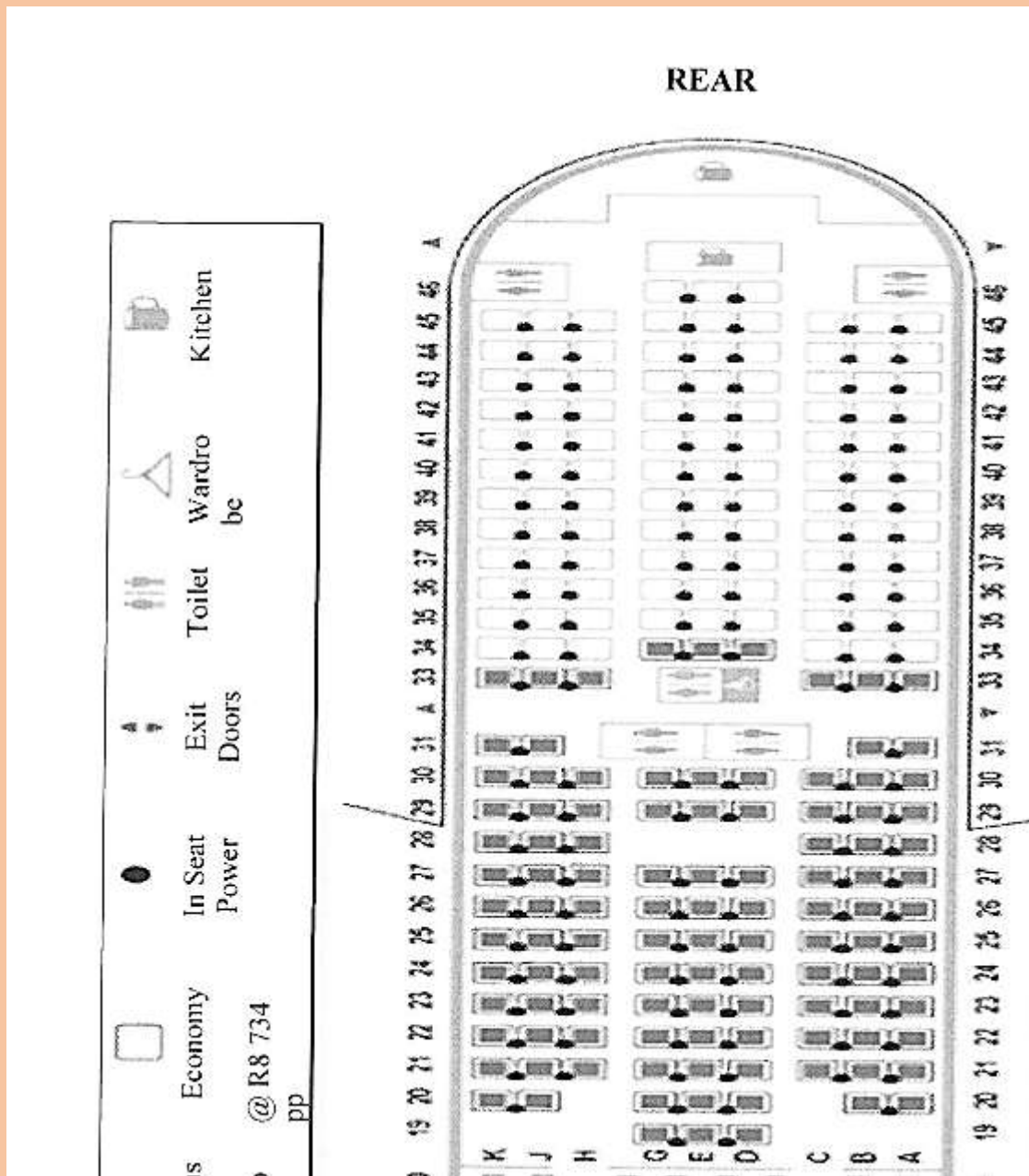
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Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_



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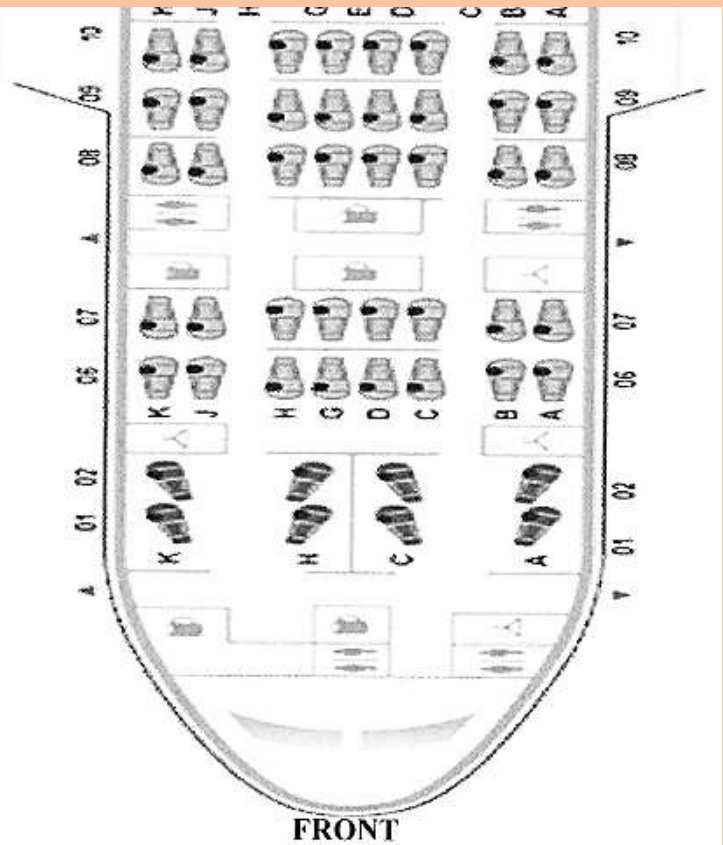
Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE A**

**QUESTION 2.1**

**KEY:** explain the properties of a plane

	United Global 1st class @ R73 407 pp		United Business @ R65 529 pp		United Business @ R65 529 pp		Economy Plus @ R38 825 pp
--	--	---	---------------------------------	---	---------------------------------	---	------------------------------



Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE B**

**QUESTION 3.3**

**Spanish La Liga League 2015/16 football season**

Pos	Team/Club	Pld	W	D	L	GF	GA	GD	Pts
1	Barcelona	38	29	04	05	112	29	+ 83	91
2	Real Madrid	38	28	06	04	110	34	+ 76	90
3	Atletico Madrid	38		04	06	63	18	+ 45	88
4	Villarreal	38	18	10	10	44	35	+ 09	64
5	Athletic Bilbao	38	18	08	12	58	45	+ 13	62
6	Celta Vigo	38	17	09	12	51	59	<b>D</b>	60
7	Sevilla	38	14	10	14	51	50	+ 01	52
8	Malaga	38	12	12	14	38	35	+ 03	48
9	Real Sociedad	38	13	09	16	45	48	- 03	48
10	Real Betis	38	11	12	15	34	52	- 18	45
11	Las Palmas	38	12	08	18	45	53	- 08	44
12	Valencia	38	11	11	16	46	48	- 02	44
13	Espanyol	38	12	07	19	40	74	- 34	43
14	Eibar	38	11	10	17	49	61	- 12	43
15	Deportivo La Coruna	38	08	18	12	45	61	- 16	42
16	Granada	38	10	09	19	46	69	- 23	<b>39</b>
17	Sporting Gijon	38	10	09	19	40	62	- 22	<b>39</b>
18	Rayo Vallecano (R)	38	09	11	18	52	73	- 21	<b>Z</b>
19	Getafe (R)	38	09	09	20	37	67	- 30	36
20	Levante (R)	38	08	08	22	37	70	- 33	32

[Source: [http://en.m.wikipedia.org/wiki/2015-16\\_La\\_Liga](http://en.m.wikipedia.org/wiki/2015-16_La_Liga)]

**NOTE:**

	Number of games:		
Pld	Played	Pos	Position
W	Win	GF	Goals for the team
D	Draw	GA	Goals against the team
L	Lose	GD	Goal difference
		Pts	Points on the league table

Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

**ANNEXURE C**

**QUESTION 4.1**

**Tax Tables 2016/2017 for Individuals and Trusts**

**Tax rates (year of assessment ending 28 February 2017)**

<b>Taxable Income (in R)</b>	<b>Rates of Tax</b>
0 – 188 000	18% of taxable income
188 001 – 293 600	33 840 + 26% of taxable income above 188 000
293 601 – 406 400	61 296 + 31% of taxable income above 293 600
406 401 – 550 100	96 264 + 36% of taxable income above 406 400
550 101 – 701 300	147 996 + 39% of taxable income above 550 100
701 301 and above	206 964 + 41% of taxable income above 701 300

**Rebates**

Primary Rebates	R13 500
Secondary (Persons 65 and older)	R 7 407
Tertiary (Persons 75 and older)	R 2 466

**Tax Thresholds**

**The tax thresholds at which liability for normal tax commences, are:**

Persons under 65	R 75 000
Persons 65–75 years	R116 150
Age 75 and older	R129 850

**Medical Tax Credits**

Main member	R286
First dependent	R286
Each additional dependent	R192

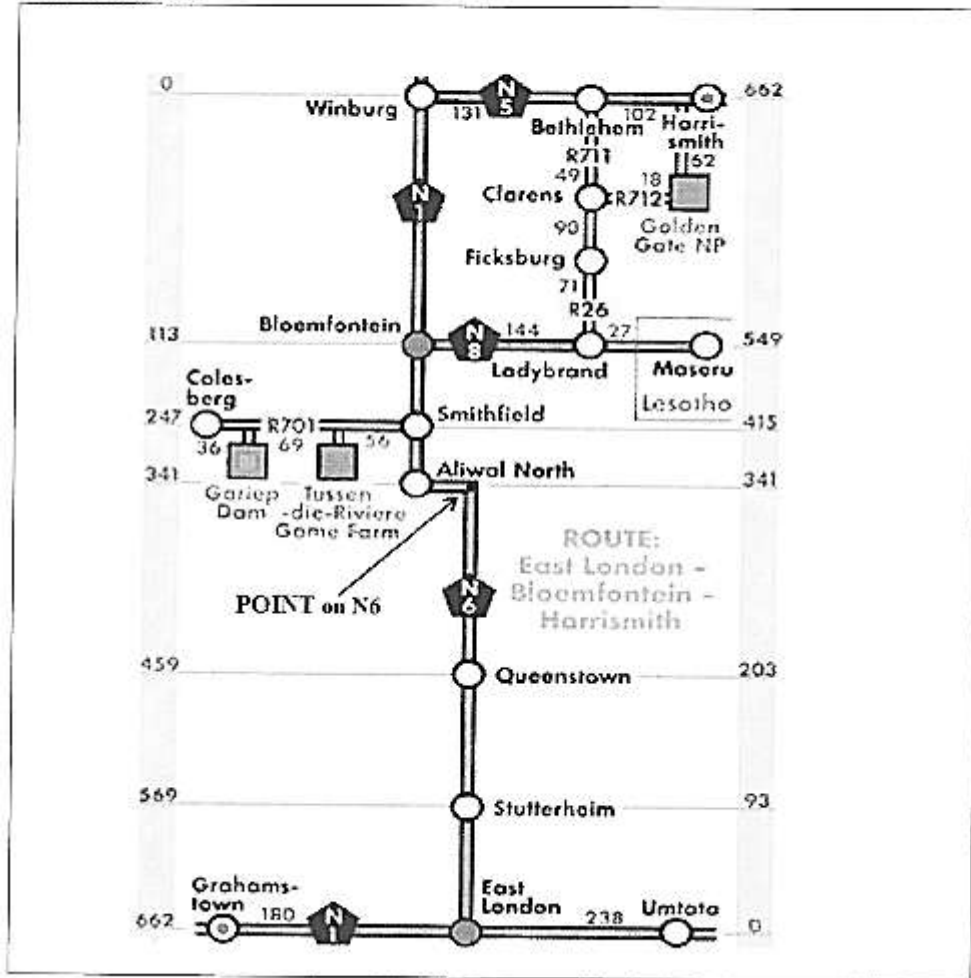
Name: \_\_\_\_\_ Surname: \_\_\_\_\_

Student No: \_\_\_\_\_ Cell No: \_\_\_\_\_

ANNEXURE D

QUESTION 4.2

STRIP CHART OF ROUTE EAST LONDON TO BLOEMFONTEIN AND HARRISMITH



[Source: <https://www.aa.co.za> and *southafrica-enroute accommodation guide*]