



education

Department:

Education

PROVINCE OF KWAZULU-NATAL

**MATHEMATICAL  
LITERACY  
WINTER CLASSES  
REVISION BOOKLET  
2019**

## HOW TO USE THIS REVISION BOOKLET?

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- This revision booklet covers selected parts of the following Mathematical Literacy topics;
  - ✓ Finance,
  - ✓ Measurement,
  - ✓ Maps, plans and other representations of the physical world,
  - ✓ Data handling and
  - ✓ Probability integrated across the other topics
- The topics drawn are from the CAPS Grade 12 curriculum in the order they are usually taught during the year. The selected parts of each topic are presented in the following way:
  - ✓ What you should know and explanation of terms and concepts;
  - ✓ Model examination-type questions for you to answer; and
  - ✓ Model answers with tips for you to use to check your own work.
- Mathematical Literacy is naturally a highly contextualised subject. Whilst every effort has been taken to ensure that the skills and concepts you will be examined on are covered in this booklet, it is in fact the actual context that will be used in the examination that will determine how these skills and concepts are assessed.
- The booklet covers mainly cognitive levels 1 and 2 questions on a 50-50 basis, with a few questions pitched at cognitive level 3. Mastery of all the questions in the booklet will therefore guarantee a minimum pass of 60% in the subject as cognitive levels 1 and 2 in the two papers combined constitute 60% of the questions.
- Work out the solutions for the entire question on your own. Then check your answers.
- Reward yourself for things you get right.
- If you get any incorrect answers, make sure you understand where you went wrong before moving on to the next section.
- The booklet covers the examination tips, both generic and subject specific. You are therefore expected to read and understand the tips so that you are able to study effectively.

**NB: The first part of this booklet consists of question 1 type of questions extracted from: SC June 2017, Nov 2017, Feb-Mar 2017, SC June 2018, Nov 2018 and June 2019. Questions are from ALL topics.**

**Attempt all these questions as much as you can, in order for you to obtain the maximum marks in *QUESTION 1 of FINAL EXAMINATION PAPER*.**

**Paper 1 (Set in a familiar context)**

- **5 Questions**
  - Question 1
    - 30 marks ( $\pm 5$ )
    - Level 1 questions only
    - All 5 application topics
  
  - Question 2
    - Finance
    - Level 1 to 3 questions
  
  - Question 3
    - Measurement
    - Level 1 to 3 type questions
  
  - Question 4
    - Maps, Plans and Other representations from the real world
    - Level 1 to 3 type questions
  
  - Question 5
    - Data Handling
    - Level 1 to 3 type questions
  
- **Mark allocation per topic in Mathematical Literacy P1**
  - Finance ( $\pm 52$  marks)
  - Measurement ( $\pm 30$  marks)
  - Maps, Plans and Other... of the real world ( $\pm 23$  marks)
  - Data Handling ( $\pm 37$  marks)
  - Probability (minimum 8 marks)
  
- **Cognitive levels for Mathematical Literacy P1**  
All levels have a range of  $\pm 5\%$ 
  - Level 1 90 marks (60% of P1)
  - Level 2 53 marks (35% of P1)
  - Level 3 7 marks (5% of P1)
  - Level 4 0 marks (0% of P1)

## INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Use the ANNEXURES in the ADDENDUM to answer the following questions:
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 and WITHIN the margins.
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, legibly and **leave** ONE line space after EACH calculation.

QUESTION 1 MJ 17

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1.1

Tyrone buys chocolates in bulk to make gift baskets containing different chocolate bars to sell. He buys boxes that contain bars of Peppermint Crisp, Bar-One, Kit Kat and Cadbury 80 g chocolate slabs.

**Picture of a gift basket with chocolate bars**



1.1.1 Determine the total price of a box with Peppermint Crisp bars if there are 40 bars in a box and the unit price of a bar is R8,70. (2)

1.1.2 Explain the term *profit*. (2)

1.1.3 A box with Kit Kat bars costs R435,04. To determine the selling price, Tyrone increases the cost price by 40%. Determine the amount that he adds to the cost price. (2)

1.1.4 Tyrone makes a gift basket containing the following items:

ITEMS	UNIT COST PRICE
Bar-One	R10,04
Peppermint Crisp	R8,70
Kit Kat	R20,66
Cadbury 80 g chocolate slab	R6,73
Empty basket	R29,99

(a) Determine the total cost price of the gift basket. (3)

(b) He sells 230 of these gift baskets and receives a total income of R22 770.

Determine the selling price of each gift basket. (2)

1.2

Mr Piedt earns an annual taxable income of R542 096,76.

TABLE 1 below is a tax table that shows how much personal income tax he needs to pay.

**TABLE 1: INCOME TAX RATES FOR INDIVIDUALS  
2017 TAX YEAR (1 MARCH 2016–28 FEBRUARY 2017)**

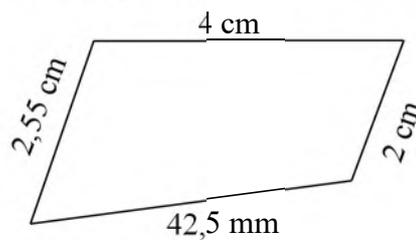
TAX BRACKET	TAXABLE INCOME (R)	TAX RATES (R)
1	0–188 000	18% of taxable income
2	188 001–293 600	33 840 + 26% of taxable income above 188 000
3	293 601–406 400	61 296 + 31% of taxable income above 293 600
4	406 401–550 100	96 264 + 36% of taxable income above 406 400
5	550 101–701 300	147 996 + 39% of taxable income above 550 100
6	701 301 and above	206 964 + 41% of taxable income above 701 300

Adapted from [www.SARS.gov.za](http://www.SARS.gov.za)

- 1.2.1 What does the acronym *SARS* stand for? (2)
- 1.2.2 Write down the minimum amount of tax payable for tax bracket 3. (2)
- 1.2.3 Calculate Mr Piedt's average monthly taxable income. (2)
- 1.2.4 Identify the tax bracket applicable to Mr Piedt's taxable income. (2)

1.3

A scaled drawing of a piece of land, using a scale of 1 : 200, is shown below.

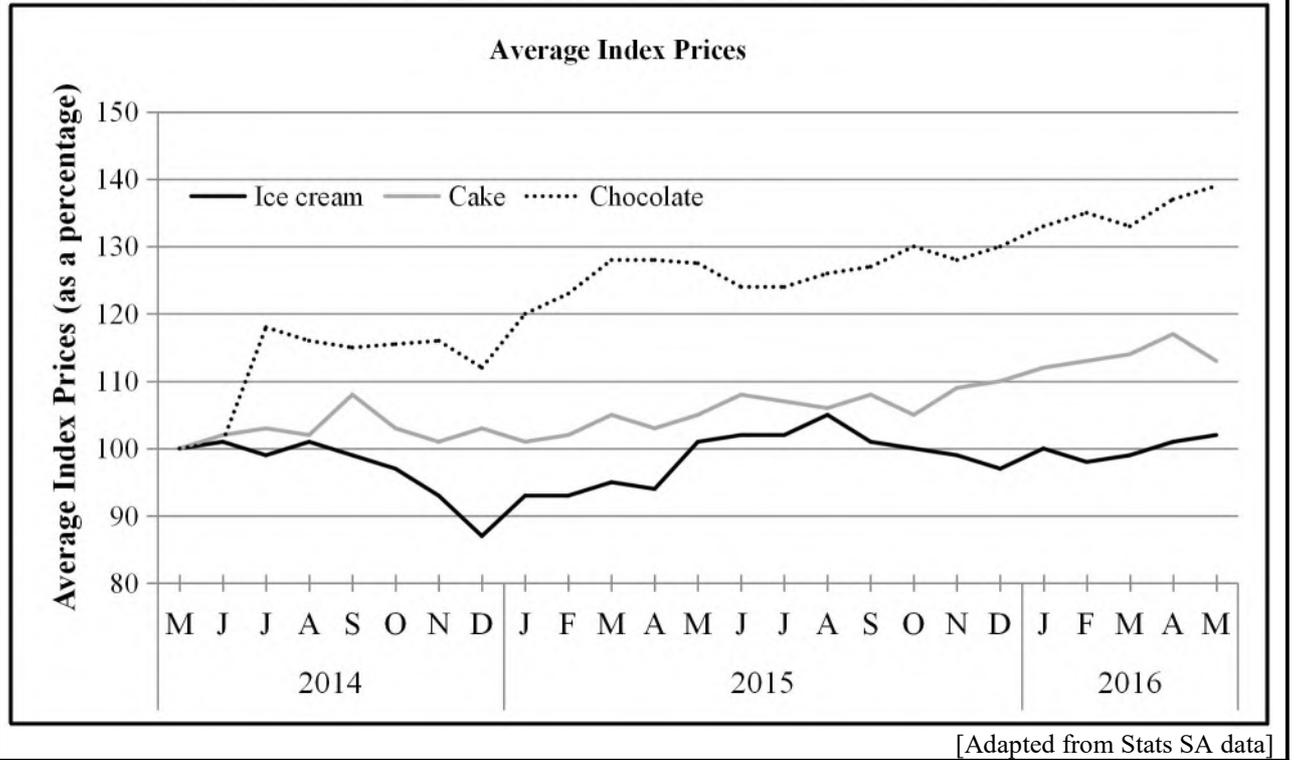


- 1.3.1 Explain the meaning of this scale. (2)
- 1.3.2 Calculate the perimeter (in centimetre) of the scaled drawing of the piece of land. (3)

1.4 Stats SA has released data showing that the average price of an 80-gram slab of chocolate has risen by 39% from May 2014 to May 2016.

The graph below shows indexes used to compare the average price of an 80-gram slab of chocolate with the average prices for cake and ice cream. The average index price, as at May 2014, was taken as 100%.

**GRAPH: THE AVERAGE INDEX PRICES (AS A PERCENTAGE) FOR ICE CREAM, CAKE AND CHOCOLATE FROM MAY 2014 TO MAY 2016**



Study the graph above to answer the questions that follow.

- 1.4.1 Give the date when the average index price for chocolate was 120%. (2)
- 1.4.2 Describe the change in the average price of cake from April 2016 to May 2016. (2)
- 1.4.3 Write down the average index price for ice cream for October 2015. (2)

**[30]**

**QUESTION 1 ND 17**

1.1 Definitions of some mathematical concepts are listed in TABLE 1 below.

**TABLE 1: DEFINITIONS OF SOME MATHEMATICAL CONCEPTS**

LETTER	DEFINITIONS
A	Middle value in an ordered data set
B	Difference between the maximum and minimum values in a data set
C	Distance from the centre of a circle to the circumference of the circle
D	Positive difference between the income and the expenditure amounts
E	Maximum distance between two points on the circumference of a circle
F	Amount received from the sale of goods or services
G	Sum of the data values divided by the number of data values

Use TABLE 1 to select the definition for EACH of the following concepts.

**NOTE:** Write down only the letter (A–G) of the correct definition.

- 1.1.1 Profit (2)
- 1.1.2 Mean (2)
- 1.1.3 Length of the radius (2)

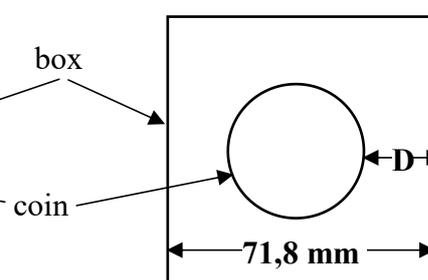
1.2 A gold coin shop buys and sells gold Krugerrand coins. The shop bought a one-ounce gold coin for R14 960 at 10:15 and sold it for R18 700 5 hours and 50 minutes later.

- 1.2.1 Calculate the profit that the shop made on this one-ounce gold coin. (2)
- 1.2.2 Write down the exact time when the coin was sold. (2)
- 1.2.3 The diameter of a one-ounce gold coin is 32,8 mm. A gold coin is placed in the centre of a square box of side length 71,8 mm, as shown below.

**PHOTOGRAPH OF GOLD COIN IN SQUARE BOX**



**DIAGRAM**



- (a) Calculate the length of the radius of the coin. (2)
- (b) Determine the shortest distance (**D**) between the edge of the coin and the side of the square box. (2)

1.3 Downloaded from Stanmorephysics.com

Naomi buys a 2 ℓ bottle of concentrated juice.  
She adds water to make 14 ℓ of diluted juice at a total cost of R44,95.  
  
She wants to serve the diluted juice in glasses.  
Each glass will contain 0,175 ℓ of diluted juice.



[Adapted from graphics24.co.za]

- 1.3.1 Calculate the cost per litre of the diluted juice. (2)
- 1.3.2 Determine, in simplified form, the ratio of:  
**volume of concentrated juice : volume of water** (2)
- 1.3.3 Determine the exact number of glasses of diluted juice that can be served. (2)

1.4

TABLE 2 below shows the mean monthly rainfall (in mm) and the mean number of rainy days per month for two South African cities.

**TABLE 2: MEAN MONTHLY RAINFALL AND MEAN NUMBER OF RAINY DAYS PER MONTH FOR KIMBERLEY AND DURBAN**

MONTH	MEAN MONTHLY RAINFALL (mm)		MEAN NUMBER OF RAINY DAYS	
	DURBAN	KIMBERLEY	DURBAN	KIMBERLEY
January	126	93	10	7
February	142	81	9	7
March	120	88	9	7
April	60	68	6	6
May	39	6	4	2
June	35	6	3	1
July	39	3	3	1
August	63	9	5	1
September	84	18	7	2
October	107	27	10	4
November	117	39	12	5
December	93	86	10	6

[Source: [www.myweather2.com](http://www.myweather2.com)]

Use TABLE 2 above to answer the questions that follow.

- 1.4.1 Arrange the mean monthly rainfall for Durban in ascending order. (2)
- 1.4.2 In which month does Kimberley receive the lowest mean monthly rainfall? (2)
- 1.4.3 Write down the modal number of rainy days for the first six months of the year for Durban. (2)
- 1.4.4 In which month does Kimberley have a higher mean monthly rainfall than Durban? (2)
- 1.4.5 During which month(s) is the mean monthly rainfall in Durban the same? (2)

[30]

1.1 A furniture store offers a dining-room suite for sale. It should be paid off in 42 equal monthly instalments of R1 078,26 (14% VAT included). No deposit is required for this offer.

[Source: [www.rochester.co.za](http://www.rochester.co.za)]

1.1.1 Express (in years) the total repayment period for this offer. (2)

1.1.2 Determine the total repayment cost for this dining room suite. (2)

1.1.3 The advertised price for this dining room suite is R29 999,00. The store offers 15% discount on the advertised price if the purchase is settled immediately in ONE payment.

Calculate the value of the discount amount offered. (2)

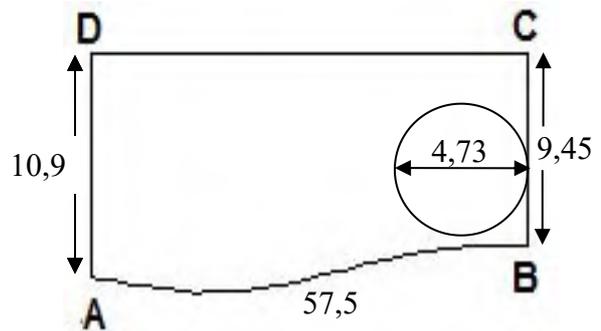
1.2 The photograph and sketch below show a circular swimming pool in a portion of Annette's garden.

**CIRCULAR SWIMMING POOL**



[Source: [www.megaide.se](http://www.megaide.se)]

**SKETCH OF THE SWIMMING POOL IN THE GARDEN WITH DIMENSIONS (in metres)**



**NOTE:** The curved distance for AB is 57,5 m.

1.2.1 Give, in simplified form, the ratio of distance **AD** to distance **CB**. (2)

1.2.2 The perimeter of **ABCD** is 125,92 m.

Calculate the distance **CD**. (2)

1.2.3 Write down the length of the radius of the pool. (2)

1.2.4 A fence will be erected along the curved side **AB** at a cost of R97,56 per running metre.

Calculate the total cost of erecting the fence. (2)

1.3

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TABLE 1 below shows the weather forecast with maximum and minimum temperatures for three cities for 29 April 2017.

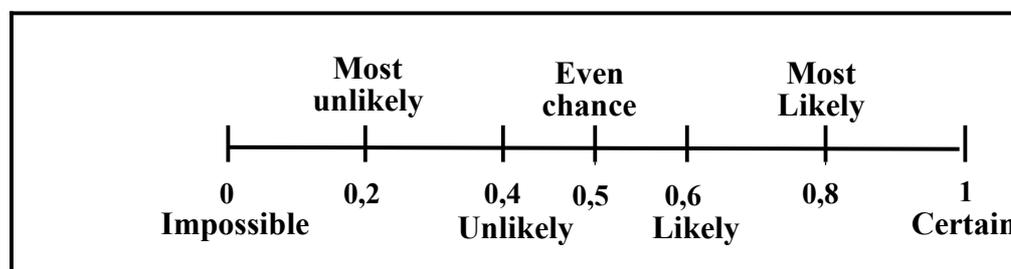
**TABLE 1: WEATHER FORECAST WITH MAXIMUM AND MINIMUM TEMPERATURES OF THREE CITIES FOR 29 APRIL 2017**

CITY	TEMPERATURE IN °C (Celsius)		WEATHER FORECAST	
	MAXIMUM	MINIMUM	SUN AND CLOUD COVER	% CHANCE OF RAIN
A	24	6		59
B	32	26		0
C	8	-7		3

[Adapted from AccuWeather.com]

Use TABLE 1 above to answer the questions that follow.

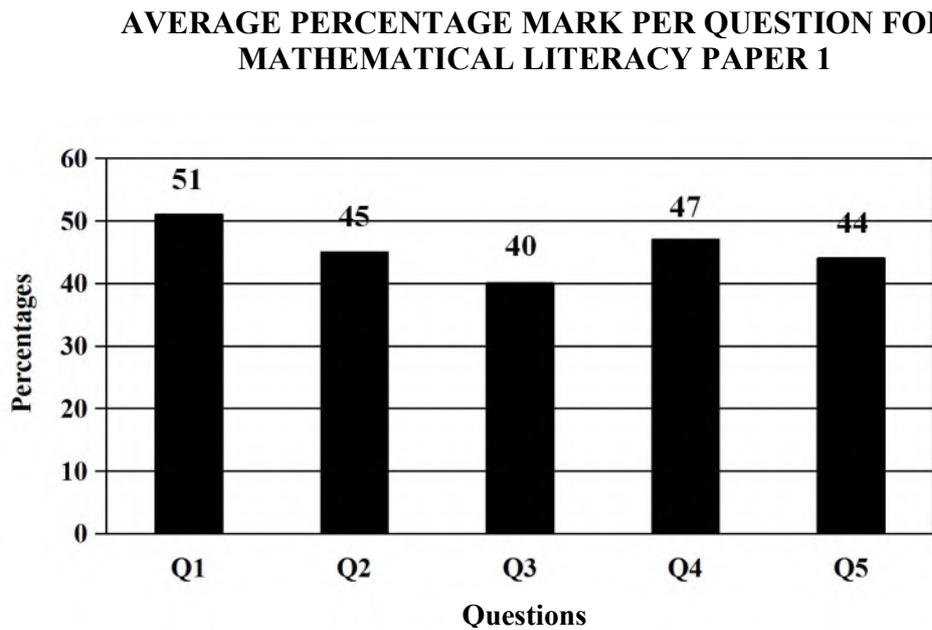
- 1.3.1 Identify the city with the lowest temperature. (2)
- 1.3.2 Calculate the temperature range for City C. (2)
- 1.3.3 A probability scale in words and as decimal fractions is given below.



Use the probability scale and TABLE 1 above to answer the questions that follow.

- (a) Identify the city that has NO chance of rain. (2)
- (b) Write down, in words, the chance of rain for City A. (2)

2016 candidates wrote Mathematical Literacy Paper 1 in 2016. The paper had a total of 150 marks and candidates had three hours to complete the paper. The graph below shows the average percentage mark per question for this paper.



[Source: 2016 NSC Examination Diagnostic Report]

Use the information and the graph above to answer the questions that follow.

- 1.4.1 Name the type of graph used to represent the data. (2)
- 1.4.2 Express the number of candidates who wrote this paper in words. (2)
- 1.4.3 Identify the question in which the candidates obtained the second lowest average percentage mark. (2)
- 1.4.4 Determine (in minutes) the average time per mark required for this paper. (2)

[30]

1.1

The graphs below show the water tariffs for Cape Town and Johannesburg. Study the graphs below and answer the questions which follow.

<b>CAPE TOWN</b>			
	<b>Kilolitres (kℓ) used per month</b>	<b>Price</b>	<b>Increase (%)</b>
Step 1	0–6	Free ■ R4,56	New
Step 2	6–10,5	■ R16,54 ■ R17,75	7,3%
Step 3	10,5–20	■ R23,54 ■ R25,97	10,3%
Step 4	20–35	■ R40,96 ■ R43,69	6,6%
Step 5	35–50	■ R66,41 ■ R113,99	71,6%
Step 6	> 50	■ R200,10 ■ R302,24	51%
<b>JOHANNESBURG</b>			
	<b>Kilolitres (kℓ) used per month</b>	<b>Price</b>	<b>Increase (%)</b>
Step 1	0–6	Free ■ R7,14	New
Step 2	6–10	■ R7,14 ■ R7,58	6,2%
Step 3	10–15	■ R12,07 ■ R13,17	9,1%
Step 4	15–20	■ R17,65 ■ R19,63	11,2%
Step 5	20–30	■ R24,03 ■ R26,96	12,2%
Step 6	30–40	■ R25,81 ■ R29,22	13,2%
Step 7	40–50	■ R32,27 ■ R37,11	18%
Step 8	> 50	New ■ R38,72	20%
<b>Key: 2016/17 ■ 2017/18 ■</b>			

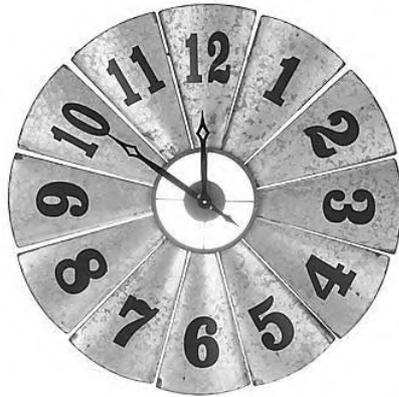
[Adapted from [www.graphics24.co.za](http://www.graphics24.co.za)]

- 1.1.1 State the type of graph used to represent this data. (2)
- 1.1.2 Arrange Cape Town's percentage increase in descending order. (2)
- 1.1.3 Identify the step that indicates the largest increase (in rand) in Cape Town's water tariff from 2016/17 to 2017/18. (2)
- 1.1.4 Determine in which ONE of the two cities water is more expensive. (2)
- 1.1.5 Calculate the cost of 3,5 kℓ of water in Johannesburg during 2017/18. (2)
- 1.1.6 Is the data given categorically or numerically? (2)

Downloaded from Stanmorephysics.com  
 The price list given below shows the selling price and profit for different types of clocks. Study the price list and answer the questions that follow.

**CLOCK A**

Selling price: R3 350,00  
 Profit: R914,00



**CLOCK B**

Selling price: R220,00  
 Profit: R60,00



**CLOCK C**

Selling price: R2 100,00  
 Profit: R573,00



**CLOCK D**

Selling price: R5 950,00  
 Profit: R1 623,00



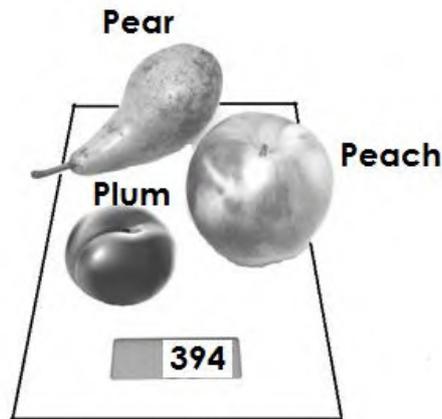
All prices exclude 14% VAT.

[Adapted from [www.pricecheck.co.za](http://www.pricecheck.co.za)]

- 1.2.1 Explain the term *cost price*. (2)
- 1.2.2 Calculate the cost price of **CLOCK A**, excluding VAT. (2)
- 1.2.3 Write down the time on **CLOCK B**, using the 24-hour format if it represents the time in the evening. (2)
- 1.2.4 Calculate the total profit made if all four clocks are sold. (2)

1.3

The photograph below shows an electronic kitchen scale (in grams) with three fruits placed on the scale.



The mass of the pear is 128 g.

The mass of the plum is half the mass of the pear.

**NOTE:** 1 kg = 1 000 g

[Adapted from [www.pricecheck.co.za](http://www.pricecheck.co.za)]

Use the photograph and information above to answer the questions that follow.

- 1.3.1 Convert the total mass of the fruit into kg. (2)
- 1.3.2 The pear is removed from the kitchen scale. Write down the new reading (in grams) shown on the kitchen scale. (2)
- 1.3.3 Show how the mass of 202 g for the peach was calculated. (3)
- 1.3.4 Determine the probability of randomly selecting a banana from the fruit placed on the kitchen scale. (2)
- 1.3.5 Write down the simplified ratio of the total mass of fruit to the total mass of the pear. (2)

**[31]**

**QUESTION 1 ND 18**

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1.1

Happy Life Superstore advertised the specials below for the annual Black Friday in 2017.

 <p>2 ℓ bottles</p> <p>Coke, Sprite and Fanta 30% OFF R11 each</p>		 <p>Ariel 50% OFF R45 each</p>	
 <p>Sunlight 35% OFF R18</p>	 <p>Classic 45% OFF R15 each</p>	 <p>Liquifruit 40% OFF R22 each</p>	 <p>Weetbix Save R20 R44</p>
 <p>Jacobs Save R35 R65 each</p>	 <p>Airborne Save R25 R30 per pack</p>	 <p>hth Save R70 R250</p>	 <p>Gaviscon Save R30 R43</p>

[Source: [www.checkers.co.za](http://www.checkers.co.za)]

**NOTE:**

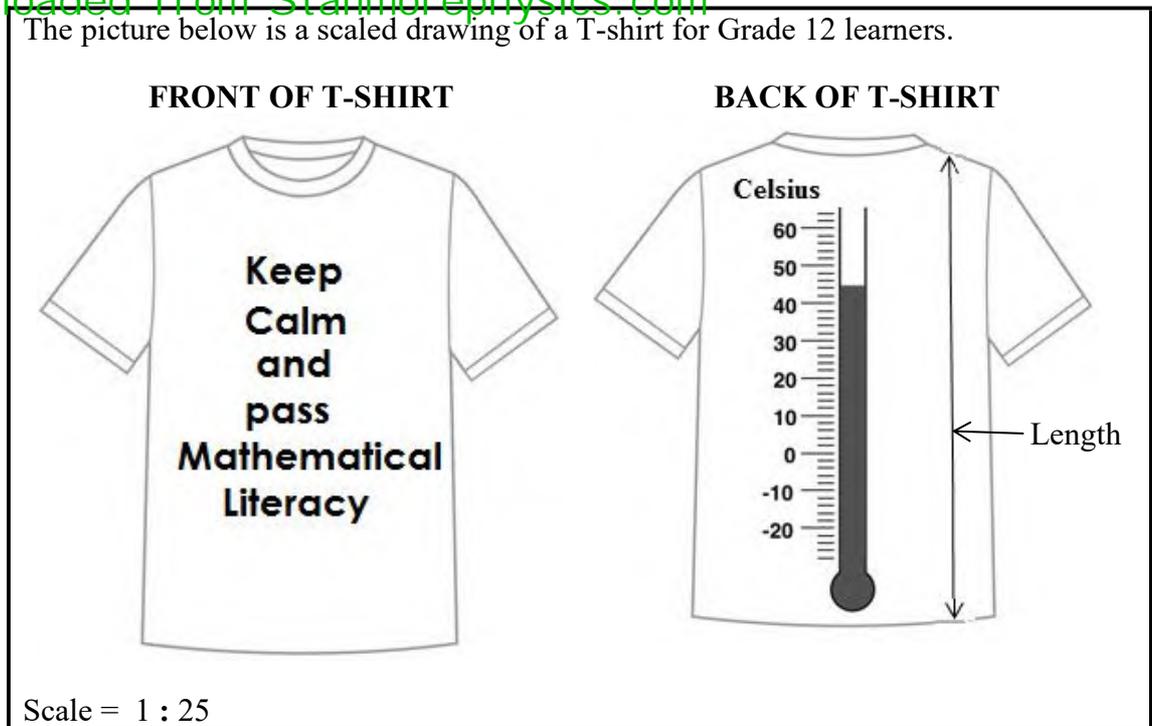
- 1 ℓ = 1 000 ml
- ALL amounts given INCLUDE the discount

Study the advertisement above to answer the questions that follow.

- 1.1.1 Write down the number of day(s) on which these prices are valid. (2)
- 1.1.2 Calculate the original price of hth before the saving. (2)
- 1.1.3 Write down the name of the product which is now half price. (2)
- 1.1.4 Convert 750 ml to litres. (2)
- 1.1.5 Calculate the total price of ONE 2 ℓ-bottle of Coca Cola and TWO 2 ℓ-bottles of Fanta. (2)
- 1.1.6 Arrange ALL the sale prices in ascending order. (2)

1.2

The picture below is a scaled drawing of a T-shirt for Grade 12 learners.



- 1.2.1 Calculate the number of letters needed to print the logo on the front of the T-shirt. (2)
- 1.2.2 Write down the temperature displayed on the thermometer in °C. (2)
- 1.2.3 Explain the meaning of the scale in the drawing above. (2)
- 1.2.4 Measure the length of the back of the T-shirt in mm, as indicated in the drawing. (2)

1.3 The Two Oceans Marathon and the Comrades Marathon are two of the most popular ultramarathons in the world.

TABLE 1 below shows the dates, distances and entry fees of these marathons.

**TABLE 1: TWO OCEANS MARATHON VS COMRADES MARATHON**

	<b>TWO OCEANS</b>	<b>COMRADES</b>
<b>Date (2017)</b>	15 April 2017	4 June 2017
<b>Distance</b>	56 km	89 km
<b>Entry fee</b>	R520,00	R460,00

[Adapted from [www.capetownmagazine.com](http://www.capetownmagazine.com) and [www.news.comrades.com](http://www.news.comrades.com)]

Use TABLE 1 above to answer the questions that follow.

- 1.3.1 Which race took place first? (2)
- 1.3.2 Which one of the two races had the longest distance? (2)
- 1.3.3 Determine the difference between the entrance fee of the Two Oceans Marathon and the entrance fee of the Comrades Marathon. (2)

1.4

The Comrades Marathon Association (CMA) has issued its medical statistics for the race held on Sunday 4 June 2017.

Start of the race: 05:30

End of the race: 17:30

TABLE 2 shows the medical statistics on race day.

**TABLE 2: MEDICAL STATISTICS**

Athletes starting the race	17 031
Athletes finishing the race	13 852
Athletes treated in the medical tent	400
Hospital-treated athletes	90
Hospital-admitted athletes	40

[Adapted from <http://www.runnersworld.co.za>]

Use TABLE 2 above to answer the questions that follow.

- 1.4.1 Write down the maximum time given to the athletes to complete the Comrades Marathon. (2)
- 1.4.2 State if the medical statistics data is discrete or continuous. (2)
- 1.4.3 Write down the ratio of athletes starting the race to the athletes finishing the race. (2)

[32]

**QUESTION 1 MJ 19**

1.1

ANNEXURE A shows a revolving credit loan taken out from Woolworths Financial Services.

**NOTE:**

A revolving credit plan is a loan where a person can re-use all or part of the money that has been paid back towards the loan without applying for it again.

Use ANNEXURE A to answer the questions that follow.

- 1.1.1 Identify the borrower of the revolving credit loan. (2)
- 1.1.2 Write down the loan amount available on this statement. (2)
- 1.1.3 Write down the number of statements the borrower will receive in ONE year. (2)
- 1.1.4 Explain the term *debit order*. (2)
- 1.1.5 Calculate the number of days from the statement date to the payment due date. (2)
- 1.1.6 Calculate the closing balance (A) of the loan taken on 29/04/2016. (2)

MON.	TU.	WED.	TH.	FRI.	SAT.	SUN.
			1	2	3	4
						
			19 °C	26 °C	22 °C	21 °C
			9 °C	7 °C	11 °C	6 °C
5	6	7	8	9		
						
20 °C	14 °C	15 °C	15 °C	16 °C		
9 °C	9 °C	7 °C	3 °C	8 °C		

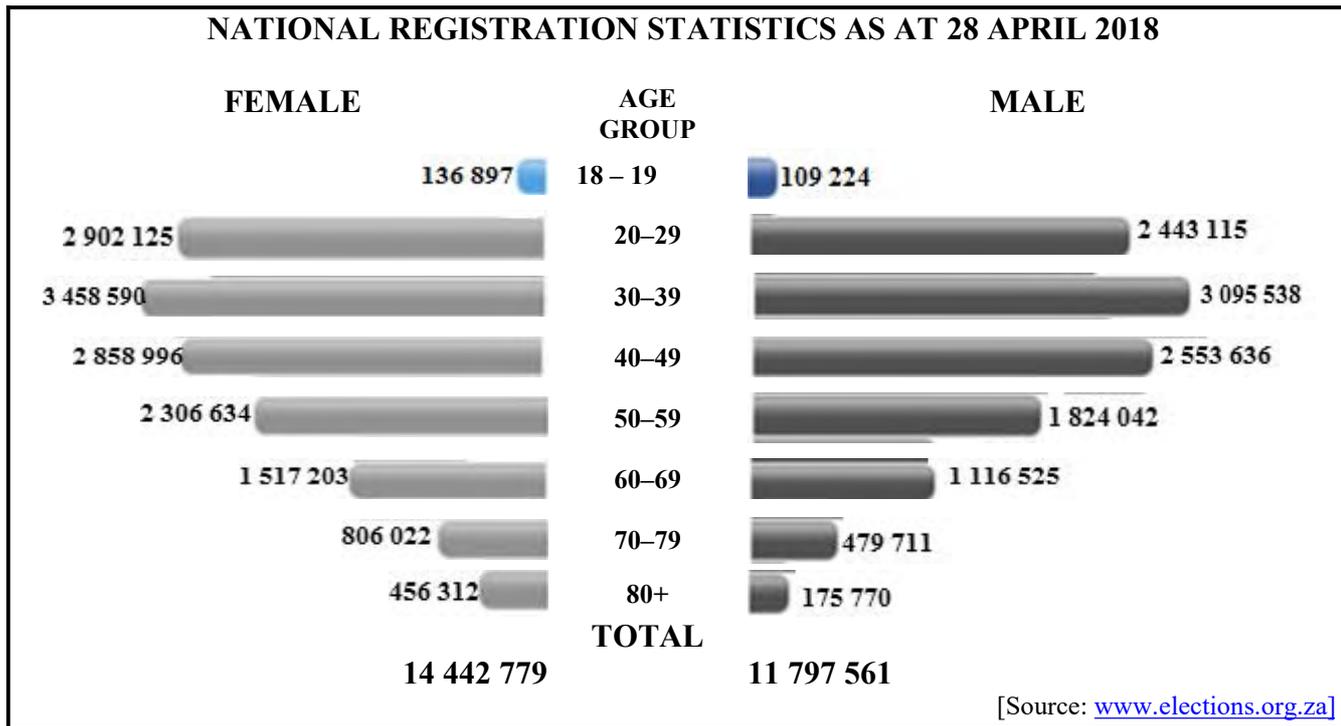
KEY	
	Sunny
	Cloudy
	Rain
	Rain and lightning
35 °C	Max. temp.
7 °C	Min. temp.

[Source: [www.wunderground.com](http://www.wunderground.com)]

Study the information above and answer the questions that follow.

- 1.2.1 Identify the maximum temperature for Friday 2 June 2017. (2)
- 1.2.2 Write down the full date on which the lowest minimum temperature was measured. (2)
- 1.2.3 Arrange the maximum temperatures in descending order. (2)
- 1.2.4 Determine the date when there was rain and lightning. (2)
- 1.2.5 Determine the difference between the maximum and minimum temperatures on Thursday 8 June 2017. (2)

1.3 The comparative bar graph shows the national registration statistics of the population of South Africa for both male and female as at 28 April 2018.



Study the graph above and answer the questions that follow.

- 1.3.1 Write down the age group in which the second highest number of female voters have registered. (2)
- 1.3.2 Calculate the number of male voters under the age of 40 years. (2)
- 1.3.3 Write down, in words, the number of female voters in the 40–49 age group. (2)
- 1.3.4 State whether the data in the graph is discrete or continuous. (2)
- 1.3.5 Calculate the difference between the total number of male and female voters. (2)

[32]

Make sure you are able to:

- Define (explain) the meaning of financial terms
- Calculate total income/ expenses from a given set of amounts and analyse the break-even point;
- Calculate profit/loss if income and expenses are both given;
- Substitute into a given formula;
- Rounding should be done according to the given context;
- Read information directly from a financial table;
- Calculate simple interest and compound interest without using a formula;
- Increase or decrease a given amount by a certain percentage;
- Calculate a one-step currency fluctuation and exchange rates;
- Identify exchange rates between two currencies from the table
- Show awareness of the significance of digits.
- Calculate PAYE/personal tax.

## SECTION: TARIFFS

A tariff is a charge in Rands per measuring unit for a specific service, such as electricity, water and telephone calls.

- Water consumption is measured by kilo litres (*Kl*)
- electricity consumption in kilowatt-hours (*kWh*)
- cell phone airtime in minutes or seconds

Tariffs are NOT always constant

The formulae for calculating the total cost is:

**Total cost = number of units x tariff (cost per unit)**

### Worked Out Examples - Water and Electricity

1. The table below indicates the example of sliding scales for water tariffs

<b>Residential</b> (all tariffs are VAT exclusive)		
Up - 6 kl	First 6 kl	Free
> 6 kl - 10 kl	Next 4 kl	R5,21 per kilolitre
> 10 kl - 15 kl	Next 5 kl	R7,87 per kilolitre
>15 kl - 20 kl	Next 5 kl	R10,52 per kilolitre
>20 kl - 30 kl	Next 10 kl	R13,38 per kilolitre
>30 kl – 40 kl	Next 10 kl	R13,97 per kilolitre
>40kl	Over 40 kl	R16,96 per kilolitre

1.1. If Marcus used 21kl of water during a certain month. Calculate the total cost using the table above. **Solution:**

**6 + 4 + 5 + 5 + 1 = 21**

the first 6 kl @ R0,00 = R0,00 ✓

the next 4 kl @ R5,21/kl = R20,84 ✓

the next 5 kl @ R7,87/kl = R39,35 ✓

the next 5 kl @ R10,52/kl = R52,60 ✓

the next 1 kl @ R13,38/kl = R13,38 ✓

**Total 21 kl = R126,17✓ (6)**

2. Use the tariff structure for water to complete the table below:

Quantity/block × rate	Total Cost per block	Total Volume of water used
6 kl @ R0,00	<b>A</b>	<b>B</b>
<b>C @ R8,35</b>	R75,15	<b>D</b>
15 kl @ <b>E</b>	<b>F</b>	30 kl
<b>G @ R12,53</b>	R187,97	<b>H</b>

2.1 Copy and complete the table above.

**Solution:**

Quantity/block × rate	Total per block	Total Volume of water used
6 kl @ R0,00	<b>A = R0,00 ✓</b>	<b>B = 6 kl ✓</b>
✓ <b>C = 9 kl @ R8,35</b>	R75,15	<b>D = 15 kl ✓</b>
15 kl @ <b>E = 10,16 ✓</b>	<b>F = R152,40 ✓</b>	30 kl
✓ <b>G = 15 kl @ R12,53</b>	R187,97	<b>H = 45 kl ✓</b>

(8)

2.2 Calculate what a homeowner would pay for **42 kl** of water using the table below:

<b>Residential</b> (all tariffs are VAT exclusive)	
≤ 6 kl	Free
6 kl < x ≤ 15 kl	R8,35 per kl
15 kl < x ≤ 30 kl	R10,16 per kl
30 kl < x ≤ 45 kl	R12,53 per kl
45 kl < x ≤ 60 kl	R12,98 per kl
>60 kl	R14,34 per kl

**Solution:**

**6 × R0,00 = R0,00 ✓**

**9 × R8,35 = R75,15 ✓**

**15 × R10,16 = R152,40 ✓**

**12 × R12,53 = R150,36 ✓**

**Total cost = R0,00 + R75,15 + R152,40 + R150,36**  
**= R377,91 ✓**

2.3. On average, Joe pays R200 for water each month. Calculate his average water consumption.

**Solution:**

Joe gets 6 for free, the next 9 kl cost him R75,15, which leaves him with ✓

$$R200,00 - R75,15 = R 124,85 \checkmark$$

$$\text{Then } R124,85 \div 10,16 \checkmark = 12,288 \text{ kl } \checkmark$$

Therefore, his average water consumption is 6 kl + 9 kl + 12,288 kl = 27,29 kl ✓ (5)

3. The table below indicates the tariffs for Emfuleni Local Municipality for 2018/19  
**Emfuleni Local Municipality – Tariff Structure for 2018/2019.**

	<b>Household (all tariffs are VAT exclusive)</b>	
<b>Block 1</b>	0 - 50 KWh	R0,8375 per KWh
<b>Block 2</b>	51 - 350 KWh	R0,9440 per KWh
<b>Block 3</b>	351 - 600 KWh	R1,2629 per KWh
<b>Block 4</b>	Over 600 KWh	R1,5156 per KWH

3.1. How much will Thabo pay for 350 kWh of electricity?

**Solution:**

$$\begin{aligned} \text{1<sup>st</sup> 50 kWh: } & 50 \times R0,8375 \\ & = R41,875 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Next 300 kWh: } & 300 \times R0,9440 \\ & = R283,20 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Total cost} & = R41,875 + R283,20 \checkmark \\ & = R325,075 \checkmark \\ & \approx R325,08 \checkmark \end{aligned}$$

3.2. If VAT is charged at 15%, how much will Thabo pay in total? (2)

**Solution:**

$$\begin{aligned} R 325,08 \times 1,15 \checkmark \\ = R373,84 \checkmark \end{aligned}$$

4. Mr Benny Dlamini, a resident in the Dikwena Municipality, has a flat rate electricity system in his house. He receives the following electricity bill for January.

**ELECTRICITY BILL**

Type of System: Paid in Advance      Dikwena Municipality

<b>Account No.</b>	<b>Account Date</b>	<b>Enquiries</b>	<b>Fax</b>		
00112371	31/01/2019	427-1914	427 - 1920		
<b>Name</b>	<b>Street Address</b>	<b>Location</b>	<b>Type of Dwelling</b>		
Mr Benny Dlamini	Ridgeside Road	Mpipi	Residential		
<b>Date</b>	<b>Details</b>	<b>Charge/Tariff</b>	<b>Cost</b>	<b>VAT (15%)</b>	<b>Amount Due</b>
31/01	<b>Electricity Consumption:</b> Reading in December: 376 912 kWh				
28/01	Current reading: 377 449 kWh				
	Consumption for January 537 kWh	31,5 c/Kwh	R169,16	R25,37	R194,53
28/01	<b>Additional charges:</b> Fixed Service Fee Fixed	R58,80 per month		R8,82	R67,62
28/01	Network Charge	R20,20 per month		R3,03	R23,23
<b>Total Amount Due</b>					<b>R285,38</b>

4.1 At the end of February, the reading on Mr Dlamini's electricity meter is 377 957 kWh. Calculate the Total Amount Due by Mr Dlamini for his electricity consumption in February.

$$\begin{aligned} \text{Solution: Consumption for February} &= 377\,957 - 377\,449 \\ &= 508 \text{ kWh } \checkmark \end{aligned}$$

$$\begin{aligned} \text{Cost of electricity} &= 508 \text{ kWh} \times 31,5 \text{ c/kWh } \checkmark \\ &= 16\,002 \text{ c } \checkmark \end{aligned}$$

$$= \text{R}160,02 \checkmark$$

$$\begin{aligned} \text{Cost including VAT} &= \text{R}160,02 \times 1,15 \\ &= \text{R}184,02 \checkmark \end{aligned}$$

$$\begin{aligned} \text{Total due} &= \text{R}184,02 + \text{R}67,62 + \text{R}23,23 \checkmark \\ &= \text{R}274,87 \checkmark \end{aligned}$$

(7)

- Activity 0: Water and Electricity Tariffs
1. A certain municipality has the two different tariff structures for water. One structure is for normal times when there are no water restrictions. The other structure is for dry times with water restrictions, when people have to pay more for water.

	Usage (kl)	Normal	With restrictions
		Charge per kl	Charge per kl
1	0 - 6	R0,00	R8,35
2	+6 - 15	R8,35	R10,16
3	+15 - 30	R10,16	R12,53
4	+30 - 45	R12,53	R12,98
5	+45 - 60	R12,98	R14,34
6	60+	R14,34	R20

- 1.1 How much more would a household using 18 kl water have to pay during times when water restrictions are imposed? (7)
- 1.2 If a household pay R200 for water during normal times, calculate the number of kl used. Round your answer off to the nearest whole number. (5)

2. Mr J Sibisi received an account bill from the municipality. Study the table extracted from the municipality account statement showing the water amount to be paid and answer the questions that follow.

Date	Service	Details	Charge (excl. VAT)	VAT	Charge (incl. 15% VAT)
20/06/18	Water	Meter No. B-ZGD543 Tariff: Water Domestic Reading dates: Current (09/05/18) = 2 384 Previous (07/04/18) = 2 368 Water 16 kl	R184,66	-----	R212,36
WATER		DEBT COLLECTION ACTION			
WA 0100: 6 kl @ 9,941230		The supply of services may be discontinued if any amount is unpaid after the due date and the deposit may be reviewed simultaneously. Please note			
WA 0100: 4 kl @ 10,136180					
WA 0100: 10 kl @ 14,077830					
WA 0100: 10 kl @ 18,249050					

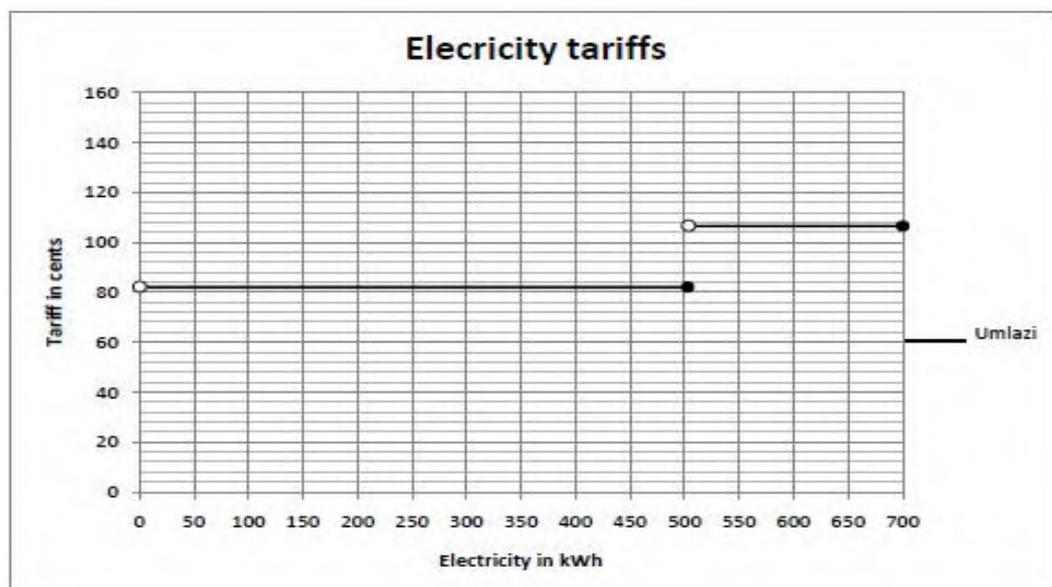
- 2.1 Calculate the amount of VAT (VALUE ADDED TAX) charged for the water tariff given in the table. (2)
- 2.2 Show how the total amount of R184,66 was calculated. (3)

3. Study the tables below and answer the questions that follows:

Downloaded from Stanmorephysics.com

Umlazi City Power – Tariffs and Charges (all rates are VAT exclusive)		Meloding City Power – Tariffs and Charges (all rates are VAT exclusive)	
0-300 kWh	R0, 8245 per kWh	0 - 150 kWh	64,93c per kWh
301 - 500 kWh	R0, 8245 per kWh	150,1 - 350 kWh	89,95c per kWh
501 - 1000 kWh	R1, 0715 per kWh	350,1 - 600 kWh	118,11c per kWh
1001 - 2000 kWh	R1, 0933 per kWh	More than 600	140,18c per kWh
2001 - 3000 kWh	R1, 1197 per kWh		
>3000 kWh	R1, 1337 per kWh		

- 3.1. If VAT is 15%, how much will 250 kWh cost in Umlazi (VAT inclusive)? (3)
- 3.2. Calculate the difference in costs (VAT exclusive) of 350 kWh of electricity in Umlazi and the same amount of electricity in Meloding. (8)
- 3.3. Mabel buys electricity for R550 (excluding VAT) from Umlazi City Power. How many kWh of electricity does he receive? (4)
- 3.4. If Disebo (from Meloding) spends R550 (excluding VAT) on electricity, does she get more, the same or less kWh of electricity as Mabel? Justify your answer, showing ALL calculations. (5)
- 3.5.1 The graph below indicates the tariffs (VAT excluded) for electricity up to 700 kWh from Umlazi. Use the same grid to draw the graph of the tariffs up to 700 kWh for Meloding. Work with prices excluding VAT in all the questions that follow. (4)



- 3.5.2 Write down the maximum quantity in kWh of electricity that users in both cities must use in order to pay the lowest tariff. (2)
- 3.5.3 In which interval does electricity in Meloding cost less than in Umlazi? (2)

(28)  
[45]

QUESTION 2 MJ 17

2.1

Amooh Siya has a savings account at CPT Bank. On ANNEXURE A is a statement for the period 22/10/2015 to 20/12/2015. Some of the amounts have been omitted.

Use the information on ANNEXURE A to answer the questions that follow.

- 2.1.1 Determine the balance in the savings account on 22/10/2015. (2)
- 2.1.2 Calculate the monthly interest amount on 31/10/2015. (2)
- 2.1.3 To prevent fraud, the bank omits the last four digits from the account number. Give an example of a possible account number for this statement. (2)
- 2.1.4 Name the person who transferred an amount of money into this account. (2)
- 2.1.5 Write down the number of unprocessed transaction items on this statement. (2)
- 2.1.6 Determine the probability of randomly selecting a transaction from this statement that was made from 1 December 2015 to 20 December 2015. (2)
- 2.1.7 The total VAT inclusive amount on this statement is R19,60.
  - (a) Show how this amount was calculated. (2)
  - (b) Calculate the VAT amount for R19,60. (3)

2.2

During 2016 the Msunduzi municipality released its approved budget for the 2016/2017 financial year. An extract from the consolidated budget is given in ANNEXURE B. Some of the amounts have been omitted. Note that all amounts reflected are in thousands of rand.

Use the information in ANNEXURE B to answer the questions that follow.

- 2.2.1 Name the item that gives the Msunduzi municipality the most income. (2)
- 2.2.2 Calculate the difference between the total income of the pre audit outcome and the original budget for 2015/16. (2)
- 2.2.3 Write down the expected income from service charges for 2016/17 in billions, rounded off to ONE decimal place. (3)
- 2.2.4 Determine the missing value **B**. (3)
- 2.2.5 Calculate the missing value **A** and state whether it is a surplus or a deficit. (5)
- 2.2.6 Calculate the percentage increase in councillors' remuneration from 2015/16 to 2016/17.  
You may use the following formula:

$$\text{Percentage increase} = \frac{\text{Difference in remuneration}}{\text{Original budgeted remuneration}} \times 100\% \quad (3)$$

**[35]**

2.1

TABLE 3 below shows the bus fare (in rand), including 14% VAT, for a single trip.

**TABLE 3: BUS FARE IN RAND FOR A SINGLE TRIP**

	Port Elizabeth	Grahamstown	King William's Town	Queenstown	Aliwal North	Bloemfontein	Welkom
Port Elizabeth		305	320	395	410	435	515
Grahamstown	305		305	385	410	435	515
King William's Town	320	305		350	410	435	465
Queenstown	395	385	350		365	410	455
Aliwal North	410	410	410	365		410	435
Bloemfontein	435	435	435	410	410		335
Welkom	515	515	465	455	435	335	

[Source: [www.greyhound.co.za](http://www.greyhound.co.za)]

Use TABLE 3 above to answer the questions that follow.

- 2.1.1 Write down the SECOND highest bus fare for a single trip between two cities. (2)
- 2.1.2 Between which two cities is the single bus fare R350,00? (2)
- 2.1.3 A person travels from Port Elizabeth to Bloemfontein via another city, City X, and uses two different buses. The total cost for this one-way trip is R755.
- (a) Calculate the cost from Port Elizabeth to City X. (2)
- (b) Hence, identify City X. (2)
- 2.1.4 Determine the cost, excluding 14% VAT, of a single bus fare of R365,00. (3)
- 2.1.5 Lindiwe travels from Queenstown to Bloemfontein and back once a month. Calculate her total return travelling cost for ONE year. (4)

2.2

ANNEXURE A shows an adapted municipal account statement (property rates and services account) of Mr Fortune.

Use ANNEXURE A to answer the questions that follow.

- 2.2.1 Write down the valuation date (month and year) of Mr Fortune's property. (2)
- 2.2.2 Name the municipal services that Mr Fortune is charged for. (2)
- 2.2.3 Determine the end date of the reading period of this statement. (2)
- 2.2.4 Show how the daily average water consumption of 0,522 kℓ was calculated. (2)
- 2.2.5 Name and explain which service on this statement is a variable expense. (3)
- 2.2.6 Determine the missing value:
- (a) **A** (2)
- (b) **B** (2)
- 2.2.7 Calculate the monthly sewerage rate (excluding 14% VAT) per square metre for this property. (2)
- 2.2.8 Write down the unpaid amount for December 2016. (2)
- 2.2.9 Mr Fortune paid R1 800 on 15 January 2017.
- Name the type of rounding he used to obtain this amount. (2)

2.3

Rajesh exchanged a gift of £360,00 to South African rand at a bank.

The exchange rate was **R1,00 = £0,05773**.

The bank charged 1,95% commission on the amount exchanged.

Rajesh then invested R5 000 of his gift in a fixed deposit account for  $1\frac{1}{2}$  years at a compound interest rate of 6,3%, per annum.

[Adapted from <http://www.xe.com> and [www.fnb.co.za](http://www.fnb.co.za)]

- 2.3.1 Calculate (in pounds) the amount of commission Rajesh paid. (2)
- 2.3.2 Convert £360,00 to rand. (3)
- 2.3.3 Calculate (without the use of a formula) the value of the fixed deposit at the end of  $1\frac{1}{2}$  years. Show ALL the steps of the calculation. (5)
- [46]

2.1

Mapotjo contributes a regular monthly amount from her salary towards a retirement annuity. This amount is deducted from her salary through a stop order on the 15<sup>th</sup> day of each month.

Below is a summary of the statement of her retirement annuity, as on 10 May 2017.

Policy number	0097541
Maturity date	1 November 2029
Monthly contribution	R740,22
Payment frequency	Monthly
Current death value	R189 817,05
Retirement value – Lower inflation rate	R536 523,25
Retirement value – Higher inflation rate	R940 465,89

[Source: [www.my.portfolio.co.za](http://www.my.portfolio.co.za)]

Use the information above to answer the questions that follow.

- 2.1.1 Define the concept *stop order*. (2)
- 2.1.2 Calculate the difference between the TWO retirement values. (2)
- 2.1.3 Determine the number of monthly contributions that still need to be paid by Mapotjo before the policy matures. (4)
- 2.1.4 Determine the total value of the contributions over five years if her monthly contribution remains the same. (3)
- 2.1.5 Fill in the missing word(s) to make the following statement TRUE.
- An annual increase in the monthly contribution would result in ... maturity value. (2)
- 2.1.6 Show that if her monthly contribution increased by 8,5%, then the new monthly deduction from her salary would be R803,14. (2)

Zoom Car Wash employs a supervisor, eight general cleaners and a machine operator. The cleaners work for seven days a week, where Monday to Saturday is regarded as normal working hours.

TABLE 2 below shows the hourly wage rate for EACH of the worker groups for 2016 and 2017.

**TABLE 2: ZOOM CAR WASH NORMAL HOURLY WAGE RATE (IN RAND PER HOUR) FOR 2016 AND 2017**

WORKER GROUP	2016	2017
Supervisor	A	21,93
General cleaners	16,40	17,76
Machine operator	17,90	19,39

[Adapted from [Mywage.co.za](http://Mywage.co.za)]

**NOTE:**

- Normal working hours: 08:30 to 17:30
- Overtime is paid at time and a third of the normal hourly rate.
- The Sunday wage rate is 150% of the normal hourly rate.

Use TABLE 2 above to answer the questions that follow.

2.2.1 Calculate the 2017 overtime hourly rate for a general cleaner. (2)

2.2.2 Determine the total wage a machine operator would earn for working only THREE Sundays. (5)

2.2.3 All the workers received a wage increase at the beginning of 2017.

(a) Show, by calculation, that the wage increase was 8,3%. (2)

(b) Calculate the missing value A. (3)

2.2.4 A general cleaner worked normal working hours for a full week.

Calculate his total weekly wage. (3)

2.3 TABLE 3 below shows the record of the vehicles washed on a particular day.

**TABLE 3: RECORD OF VEHICLES WASHED ON A PARTICULAR DAY**

CATEGORY	NUMBER	COST PER VEHICLE
Bakkies	7	R70
Cars	35	R50
Minibus	4	R75

Calculate the total income received for the vehicles washed on this particular day. (4)

The supervisor at Zoom Car Wash has to report for duty 30 minutes earlier than the normal starting time, from Monday to Saturday but leaves work at the same time as the other workers. He receives a monthly salary, works every Sunday and is paid overtime.

TABLE 4 below shows a monthly salary slip (some data omitted) for the supervisor.

**TABLE 4: MONTHLY SALARY SLIP FOR THE SUPERVISOR**

SALARY SLIP			
Name of employer	Zoom Car Wash		
Address	12 Stateway Welkom, 9460		
Name of employee	M Ncubuka		
ID No.: 890106 5387 000	Employee No.: 124567		
Position	Supervisor		
Payment period: 1 November 2017 to 30 November 2017			
	RATE	TOTAL HOURS (hrs × days × weeks)	AMOUNT IN RAND
Normal hours worked	21,93	...	<b>B</b>
Sunday hours (1,5 normal rate)	32,90	$9 \times 1 \times 4$	1 184,40
Overtime hours worked/ ( $1 \frac{1}{3}$ of normal rate)	...	$0,5 \times 6 \times 4$	350,88
<b>TOTAL Gross Salary</b>			6 272,16
UIF (1% of gross salary)			...
<b>Net salary</b>			<b>6 209,44</b>

[Source: [www.zoomhandcarwash.com](http://www.zoomhandcarwash.com)]

**NOTE:** Employer and employee each contribute a monthly amount of 1% of the employee's gross salary for UIF.

Use TABLE 4 above to answer the questions that follow.

- 2.4.1 Explain the term *employer*. (2)
- 2.4.2 State ONE benefit of contributing towards the UIF. (2)
- 2.4.3 Calculate:
- (a) The value of **B** (3)
- (b) The total UIF amount that must be paid on behalf of M Ncubuka to the Department of Labour (3)

[44]

**QUESTION 2 MJ 18**

2.1 Mrs Chan, a teacher from Brakpan, received a monthly statement from GEMS (Government Employee Medical Scheme), as shown in ANNEXURE A. Mrs Chan has one dependent, her son Lee, on her medical aid.

Use ANNEXURE A to answer the questions that follow.

- 2.1.1 Which month is covered by this statement? (2)
- 2.1.2 State why the member had to pay R445,10 to the supplier. (2)
- 2.1.3 Write down the name of the general practitioner visited. (2)
- 2.1.4 Calculate the new price of the acute medication (under the tariff code) if the price increased by 6,3%. (3)
- 2.1.5 Calculate the total amount of tax claimable in the previous statements if the tax claimable is the amount paid by the member directly to the supplier. (2)
- 2.1.6 Define the term *debit* within the context of the statement. (2)
- 2.1.7 Show how the total amount of R479,75 was calculated. (2)

2.2 John is interested in running a small internet station in a coffee shop. He searches the internet and finds the advertisement below on a website [www.wish.com](http://www.wish.com). ALL prices include 14% VAT.

	<p>Portable Pocket Hotspot (PPH) Was: R988,00 Now: R210,00</p>
	<p>New Ultra-thin mouse (UTM) Was: R223,00 Now: R13,00</p>

[Source: [www.wish.com](http://www.wish.com)]

Study the advertisement above and answer the questions that follow.

- 2.2.1 What does the acronym *VAT* stand for? (2)
- 2.2.2 Calculate the amount of VAT payable on the old price for the PPH. (3)
- 2.2.3 Calculate the difference between the *new price* and the *old price* of the UTM. (2)

2.3

John told his friend Errol, who lives in Botswana, about the profit he made when he sold the ultra-thin mouse (UTM).

Errol decided to join John as a business partner.

John and Errol then decided to share their profit in the ratio 3 : 2.

TABLE 1 below shows the currency conversion factors for a few of the currencies in terms of the South African currency on 7 January 2018.

**TABLE 1: CURRENCY CONVERSION FACTORS**

CURRENCY	UNITS PER ZAR	ZAR PER UNIT
Algerian dinar	9,546785	0,104747
Botswana pula(BWP)	0,797782	1,253475
Brazilian real	0,262231	3,813432
British pound	0,059861	16,705357
Mauritian rupee	2,726789	0,366732
Japanese yen	9,111043	0,109757

[Source: [www.x-rates.com](http://www.x-rates.com)]

Use the table and the information above to answer the questions that follow.

- 2.3.1 Write down the exchange rate between the Botswana pula (BWP) and the South African rand (ZAR). (2)
- 2.3.2 List the currencies which are weaker than the ZAR. (3)
- 2.3.3 Each mouse costs R13,00 and is sold for BWP48.
- (a) Convert R13,00 into BWP (2)
- (b) Calculate the total number of UTMs sold if a total profit of BWP7526 was made. (4)
- 2.3.4 Calculate the amount (in BWP) that Errol will receive if a total profit of BWP7526 was made. (3)
- 2.3.5 Show how the Algerian dinar of 0,104747 ZAR per unit was obtained. (2)

[38]

**QUESTION 2 ND 18**

Downloaded from [Stanmorephysics.com](http://Stanmorephysics.com)

2.1

ANNEXURE A shows the student fees statement for Tamryn Abrahams, a second-year Architecture student at the University of Cape Town (UCT).

Use ANNEXURE A to answer the questions that follow.

- 2.1.1 Explain the meaning of the term *interest* with reference to the student fees statement. (2)
- 2.1.2 Write down the balance (excluding interest) that was brought forward on the last day of the previous year. (2)
- 2.1.3 Calculate the monthly interest rate that was used on the overdue fees for the previous year. (3)
- 2.1.4 Write down the code and the name of the module/course that is the most expensive. (2)
- 2.1.5 Show how the amount of R6 317,70 was calculated. (2)
- 2.1.6 Calculate the total amount debited to this account for the courses studied in the 2017 academic year including interest on overdue fees in 2017. (3)
- 2.1.7 State the payment method used to transfer money into this account. (2)
- 2.1.8 A family friend paid the balance of R40 386,60 on condition that the amount could be paid back in equal monthly instalments, interest free.
- Show how the monthly instalment of R8 077,32 was calculated if the first payment was due on 1 November 2017 and the last payment was due on 1 March 2018. (2)

The graph below shows the effect of inflation from 2015 going back 50 years.

Downloaded from [Stannmorephysics.com](http://Stannmorephysics.com)



Below are certain South African items and their prices for the years 1970 and 2015.

		PRICE IN 1970	PRICE IN 2015
Spur burger		R0,30	R62,90
Cheddamelet steak		R0,50	R104,90
Ricoffy 750 g		R0,25	R75,00
Nestlé condensed milk		R0,10	R19,00

[Source: [www.inflation.eu](http://www.inflation.eu)]

Use the information above to answer the questions that follow.

- 2.2.1 Explain the term *inflation* within the given context. (2)
- 2.2.2 Write down the price of a Spur burger in 1970. (2)
- 2.2.3 Calculate by how much the cost, in rand, of a trolley had increased from 2000 to 2005. (3)
- 2.2.4 Calculate the percentage increase of Ricoffy from 1970 to 2015.  
You may use the following formula:
- $$\text{Percentage increase} = \frac{\text{new amount} - \text{original amount}}{\text{original amount}} \times 100 \% \quad (3)$$
- 2.2.5 A cheddamelet steak was sold for R104,90 at a percentage profit of 17,5%. Determine the cost price. (2)

2.3

TABLE 3 below shows the national budget and education budget of South Africa for 2017/18.

**TABLE 3: NATIONAL BUDGET AND EDUCATION BUDGET OF SOUTH AFRICA FOR 2017/2018**

NATIONAL BUDGET OF SOUTH AFRICA (IN RAND)		EDUCATION BUDGET OF SOUTH AFRICA (IN RAND)	
Economic affairs and agriculture	241,6 billion	Basic education	216,7 billion
Defence and public safety	198,7 billion	University subsidies	31,6 billion
Health	187,5 billion	Education administration	15,8 billion
General admin	70,7 billion	Skills development levy institutions	21,1 billion
Local development and infrastructure	195,8 billion	National student financial aid scheme (NSFAS)	15,3 billion
Debt service costs	162,4 billion	Technical and vocational education and training	7,5 billion
Social protection	180,0 billion	Other	12,5 billion
Education	320,5 billion		

[Adapted from [www.graphics24.com](http://www.graphics24.com)]

Use TABLE 3 above to answer the questions that follow.

2.3.1 Which of the amounts below represents the economic affairs and agriculture budgets?

- A 24 160 000
- B 241 600 000 000
- C 241 600 000
- D 24 160 000 000 000

(2)

2.3.2 Explain the term *budget* within the context above.

(2)

2.3.3 Write down the item which receives the third most money from the education budget.

(2)

2.3.4 Calculate the percentage of the total education budget that is allocated to the NSFAS.

(3)

2.3.5 University subsidies comprise about 9,86% of the total education budget. Estimate the combined budget, as a percentage, for education administration and the NSFAS.

(2)

[41]

**QUESTION 2 MJ 19**Downloaded from [Stanmorephysics.com](http://Stanmorephysics.com)

2.1

Susan intends selling cups of Milo at the local taxi rank for extra money. Milo is a nutritious supplementary drink developed to provide active people with key vitamins and minerals.

ANNEXURE B shows the advertisement from her local store where she intends to buy her stock.

Use ANNEXURE B to answer the questions that follow.

2.1.1 Determine the unit price when purchasing Milo option 2. (3)

2.1.2 Determine the total cost of 6 ℓ of milk. (2)

2.1.3 Explain the meaning of the word *cost price*. (2)

2.1.4 Susan decided to exclude the cost of water when calculating the cost price per cup of Milo.

TABLE 1 below shows how Susan calculated the cost price of ONE cup of Milo.

**TABLE 1:**

QUANTITY BOUGHT	COST OF INGREDIENTS	AMOUNT USED FOR ONE CUP	COST PER CUP OF MILO
1 kg Milo	R97,95	0,04 kg	<b>A</b>
1 ℓ milk	R11,99	<b>B</b>	R1,20
2,5 kg sugar	R33,20	0,01 kg	R0,13
25 foam cups	<b>C</b>	ONE	R1,78
50 spoons	R12,75	ONE	R0,26
<b>TOTAL COST</b>			<b>D</b>

(a) Calculate **A**, the cost of Milo per cup. (2)

(b) Determine **B**, the amount of milk, in litres, used for ONE cup of Milo. (2)

(c) Write down the value of **C**, the cost of 25 foam cups. (2)

(d) Show that the cost of ONE cup of Milo, **D**, is R7,29. (2)

2.1.5 Determine the selling price of ONE cup of Milo if Susan's intended profit margin is 25%. (4)

2.2

Susan started her business one month later and because of the price increase of products, it then cost her R9,50 to make ONE cup of Milo. She calculated that the daily fixed cost was R90,00 and she would be able to sell 100 cups of Milo per day. She will sell the Milo at R12,50 per cup.

Use the information above to answer the questions that follow.

2.2.1 TABLE 2 shows the income from the sale of cups of Milo.

**TABLE 2: INCOME FROM THE SALE OF CUPS OF MILO**

Number of cups of Milo (n)	0	20	30	40	80	100
Income in rand (R)	0	250	375	<b>P</b>	1 000	1 250

- (a) Determine the value of **P** in TABLE 2 above. (2)
- (b) Write down an equation that can be used to calculate the income. (2)
- (c) Identify the independent variable in TABLE 2. (2)

2.2.2 Susan uses the following formula to determine the cost price of the cups of Milo.

$$\text{Cost} = \text{R}90,00 + \text{R}9,50 \times n \text{ where } n = \text{number of cups of Milo}$$

TABLE 3 shows the cost price for a number of cups of Milo.

**TABLE 3: COST PRICE OF A NUMBER OF CUPS OF MILO**

Number of cups of Milo (n)	0	20	30	<b>Q</b>	80	100
Cost price in rand (R)	90	280	375	612,50	850	1 040

Calculate the value of **Q** in TABLE 3 above. (3)

2.2.3 The graph on ANSWER SHEET 1 shows the total income for making up to 100 cups of Milo. Use the information in TABLE 3 to draw another graph representing the cost from the selling of up to 100 cups of Milo. (3)

2.2.4 Use the tables or graphs on ANSWER SHEET 1 to answer the following questions.

- (a) Explain the meaning of the word *break-even* in the context of the question. (2)
- (b) Determine the number of cups of Milo at the break-even point. (2)

2.3

Susan decides to send R1 200 to her sister who is studying in Japan. The exchange rate on that date is 1 yen = R0,10976

2.3.1 Calculate the amount of money she sends in Japanese yen. (3)

2.3.2 State whether the yen is stronger or weaker than the rand. (2)

**[40]**

## MEASUREMENT

### Make sure you are able to:

- Calculate and estimate values using basic operations that involve length and distance, where each of the required dimensions is readily available.
- Understand and use formulae such as: perimeters and areas of polygons, volumes of right prisms, right circular cylinders, surface areas of right prisms and right circular cylinders, where the dimensions and formulae are readily available;
- Understand and use appropriate vocabulary such as: equation, formulae, Cartesian plane, area, surface area, perimeter, radius, diameter, length, breadth, height, base, circumference, volume, circle, cylinder, polygons, right prisms, triangular, rectangular and square.
- Read information directly from a table and use some given information and simple operations to complete a table of values;
- Measure values which involve length, distance, weight and time using appropriate measuring instruments sensitive to levels of accuracy in a familiar context;
- Describe relationships between input and output values in a table of data concerning space, shape and measurement;
- Convert units of measurement between different scales and systems using provided conversion tables,
- Converting to a smaller unit of length, time, weight, etc;
- Converting to a bigger unit of length, time, weight, etc;
- Converting units of area; and
- Converting units of volume.

### PERIMETER, VOLUME AND AREA

- You should be able to identify the suitable formula to be used from the list of given formulae.
- Always write the units on the answer. Round off the final answer **ONLY**. Conversions should be done if the units are not the same.
- Always use the given value for  $\pi$ . If the diameter is given, convert it to the radius before substitution into the formula or doing any calculations.

Prior-knowledge

- Dimensions
- Conversion of units
- Working with and identifying formulae according to the given shape
- Rounding Off; Rounding Up and Rounding Down according to the context
- Percentages
- Use  $\pi = 3,142$
- Knowledge of the 4 basic 2D Shapes namely Square, Rectangle, Triangle and Circle

**Temperature**

Temperature is measured in degrees Celsius in the metric system and in degrees Fahrenheit in the imperial scale.

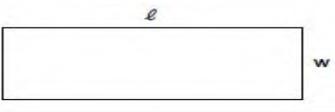
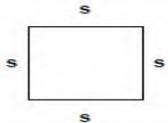
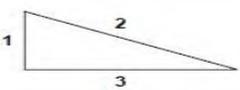
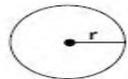
Two of the formulas for converting are as follows:

$$^{\circ}\text{C} = \frac{5}{9} (^{\circ}\text{F} - 32^{\circ})$$

$$^{\circ}\text{F} = \frac{9}{5} \times ^{\circ}\text{C} + 32^{\circ}$$

Calculate the temperature in degrees Fahrenheit if it is given in degrees Celsius.

Calculations involving surface area, perimeter and volume of rectangular prisms and cylinders.

<p><b>Perimeter formula</b></p>	
<p>Rectangle  <math>2 \times \text{length} + 2 \times \text{width}</math></p>	
<p>Square  <math>4 \times \text{length or } 4 \times \text{side}</math></p>	
<p>Triangle  <math>\text{length } 1 + \text{length } 2 + \text{length } 3</math></p>	
<p>Circumference  <math>\pi \times (2 \times \text{radius})</math> or  <math>\pi \times \text{diameter}</math></p>	

Perimeter is the distance around the shape. In the case of a circle we call it the circumference of the circle and it is given by the formula  $c = 2 \times \pi \times r$  or  $c = d\pi$ .

Formulae are given above for basic shape in calculating the perimeter.

- There are additional formulae for part of circles. Perimeter of Semi Circle  $=\pi r + d$  and the perimeter of a quarter circle is  $c = \frac{\pi r}{2} + d$

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>	

- Area tells us the size of a 2D shape in terms of squares. That i.e. if the area is  $20\text{m}^2$ , it means that if we place 20 squares together will have the size of the floor. The Area is calculated by multiplying one dimension (*length (l)*) by another (*breadth (b)*) for a given shape. Area is measured in square units.  
In grade 12 you are expected to calculate the area in complex situations, for example calculating the area of a wall that needs to be painted with the door and windows. The area of door the door and windows have to be calculated then subtracted from area of the wall to give the area to be painted.
- Substitute** the unit of measurement which will give the unit required by the question.
- Eg Calculate the Area of a Rectangle, in  $\text{m}^2$ , with length 3.2m and width of 50cm
 

Area = L x W  
 = 3.2m x 0.5m  
 = 6.1m<sup>2</sup>

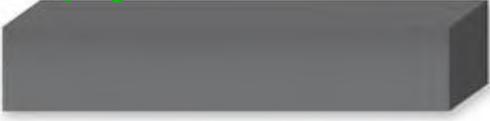
L = 3.2m  
 W = 50cm  $\div$  100 = 0.5m
- When **calculating the area of complex shapes** we calculate the area of each shape and **add them together**. The same applies to calculating the perimeter, since we **cannot simply substitute** any length and breadth **into the formula**. An example of which is dealt with in Activity 3 below.

## Volume

Volume is measured in cubic units. When calculating the volume of a 3D shape, the answer tells us the size of the open space inside the 3D shape. For example if the volume of a rectangular container is  $36\text{m}^3$  it means that 36 cubes can fit inside the container.

Similarly like in the case of surface area, you are expected to calculate the volume of a 3D figure

For example how many 200ml bottles can fit inside a 2litre bottle?

Shape	Volume formula	
Rectangular box	$V = l \times b \times h$	
Cylinder	$V = \pi \times r^2 \times h$	

### Capacity

Capacity is a measure of how much liquid a container can hold when it is full. For example an urn of boiling water in an office has a capacity of 20 litres, if it is filled to maximum capacity, calculate the number of 250ml cups that can be filled with the hot water from the urn.

Revise the skill of converting from units of volume to units of capacity e.g.

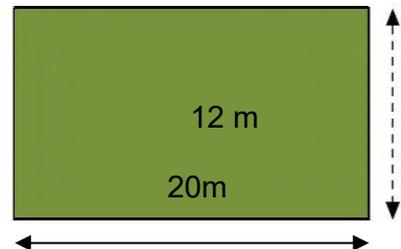
$$1\text{m}^3 = 1000\ell, 1000\text{cm}^3 = 1\ell, 1000\,000\text{mm}^3$$

Including converting from one unit of capacity to another E.g. 1000ℓ to 1kl

### Worked examples

- 1 A weed pesticide states that it requires 60 ml of concentrate for 100 m<sup>2</sup> of land area. What volume of pesticide will be required to treat the area alongside. (4)

$$L = 20\text{m and } B = 12\text{m}$$



$$\text{Area} = \text{length} \times \text{breadth}$$

$$20\text{ m} \times 12\text{ m} \checkmark$$

$$240\text{ m}^2 \checkmark$$

$$60\text{ ml} : 100\text{ m}^2$$

$$\text{Vol of pest} : 240\text{m}^2$$

$$\begin{aligned} \text{Vol of pest} &= 60\text{ml} \times 240\text{m}^2 \div 100 \checkmark \\ &= 144\text{ml} \checkmark \end{aligned}$$

- 2 A cylindrical water tank has a radius of 0.9m, with a height of 2m. 2 600 litres of water is pumped into the tank. Find the height of water in the tank (rounded to 2 decimal places). (4)

**NOTE:**  $1\text{m}^3 = 1000\text{ litres}$

You may use the formula:  $V = \pi r^2 h$ , where  $\pi = 3.142$



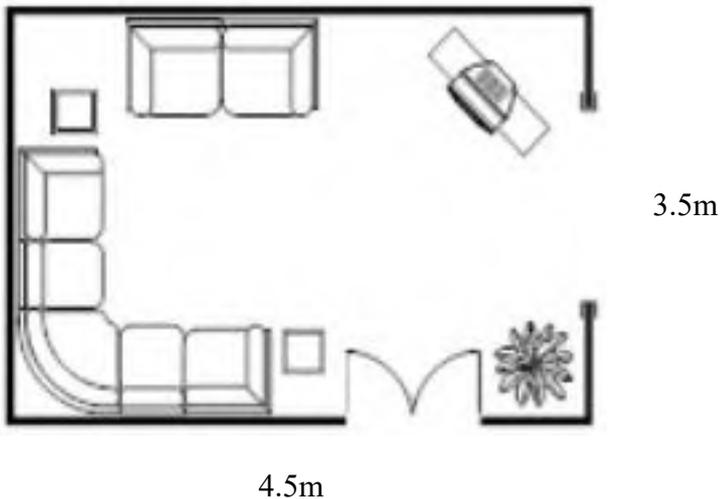
$$V = \pi r^2 h$$

$$\pi \times (0.9)^2 \text{ m} \times h = 2.6\text{m}^3 \checkmark$$

$$h = 2.6\text{m}^3 \div (\pi \times 0.81\text{cm}^2) \checkmark$$

$$= 1.02\text{m} \checkmark$$

- 3 A room measures 3.5m by 4.5m needs to be tiled. Tiles 300mm by 300mm are sold at R125 per box of 13 tiles totalling 1.17m<sup>2</sup>. Calculate the cost of the minimum number of boxes of tiles required to be bought. Include 5% more tiles for breakages. (7)



$$300\text{mm} = 0.3\text{m}$$

$$\text{Area of tile} = 0.3\text{m} \times 0.3\text{m} \checkmark$$

$$= 0.09\text{m}^2 \checkmark$$

$$\text{Area of room} = 4.5\text{m} \times 3.5\text{m}$$

$$= 15.75\text{m}^2 \checkmark$$

$$\text{Number of ceiling boards} = 15.75\text{m}^2 \div 0.09\text{m}^2 \checkmark$$

$$= 175 \text{ tiles}$$

$$5\% \text{ more} = 175 + 8.75 = 175 + 9$$

$$= 184 \text{ tiles} \checkmark$$

$$184 \div 13 = 14.15 = 15 \text{ boxes} \checkmark$$

$$\text{Cost} = 15 \times \text{R } 125 = \text{R } 1875 \checkmark$$

OR

$$300\text{mm} = 0.3\text{m}$$

$$4.5\text{m} \div 0.3\text{m} = 15 \text{ tiles} \checkmark$$

$$3.5\text{m} \div 0.3\text{m} = 11.67 \checkmark$$

$$= 12 \text{ tiles} \checkmark$$

$$\text{Therefore } 15 \times 12 \checkmark$$

$$= 180 \text{ tiles}$$

$$5\% \text{ more } 180 + 9 = 189 \checkmark$$

$$189 \div 13 = 14.53 = 15 \text{ boxes} \checkmark$$

$$\text{Cost} = 15 \times \text{R } 125 = \text{R } 1875 \checkmark$$

- 4 The floor of the tool room in a factory is going to be painted with special floor paint. (4)  
The floor area is 36 m<sup>2</sup> The spread rate of floor paint is given as 1ℓ covers 10 m<sup>2</sup>.

Floor paint is sold in 5ℓ tins for R449,00 per tin. Calculate the number of tins of paint required to paint the floor with 2 coats.

Downloaded From [Stannmorephysics.com](http://Stannmorephysics.com)

$$\begin{aligned}\text{The total area to be painted} &= 2 \times 36 \text{ m}^2 \text{ (for two coats)} \\ &= 72 \text{ m}^2 \checkmark\end{aligned}$$

$$\begin{aligned}\text{Volume of paint required} &= 72 \text{ m}^2 \div 10 \text{ m}^2/\ell \checkmark \\ &= 7.2 \ell \checkmark\end{aligned}$$

**2 tin would need to be bought. ✓**

## Activities

1

Xpress taxi consumes 12km/litre of fuel. The taxi makes a return journey from Gateway Shopping Centre in Durban to the Royal Show Grounds in Pietermaritzburg which is 102 km away. The cost of fuel is R16.48 per litre. Calculate the cost of fuel for this journey.

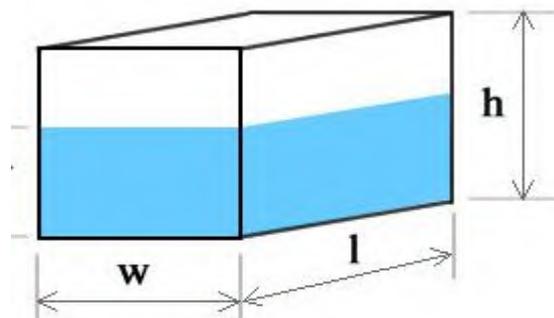


2

A water tank measures 7m by 4m with a height of 2m. 42000l of water is pumped into the tank. Find the height of water in the tank.

$$1\text{m}^3 = 1000 \text{ litres}$$

$$V = L \times B \times H$$

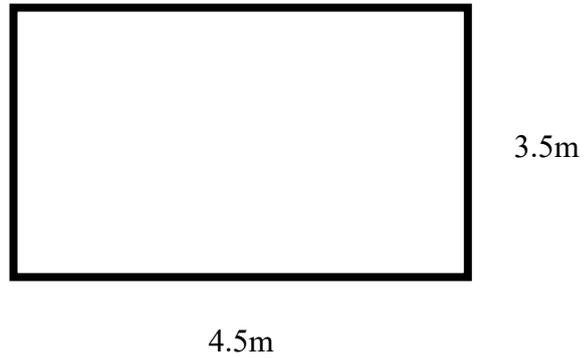


3

A room measures 3.5m by 4.5m must be fitted with a ceiling. Ceiling boards measuring 900mm by 2400mm are sold at a cost of R87.38 per board, excluding VAT.

- 3.1. How many ceiling boards are required to complete the ceiling for the room?  
Show all calculations.

3.2. Calculate the total cost (including VAT) of the boards required to be purchased.



4 LIFE-WTR, is a company that process and distributes purified water in their signature 200ml bottles (outside radius = 2.4cm and inside radius = 2cm). For shipment to customers, these bottles of water are packaged adjacent to each other into larger boxes.



**FIGURE 1 PACKAGING BOXES**



**Figure 2 WATER BOTTLES**

[https://www.google.co.za/search?q=packaging&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwikuaDF1rXcAh](https://www.google.co.za/search?q=packaging&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwikuaDF1rXcAhWBN8AKHTJACP4QiR4IlwI&biw=1333&bih=643#imgrc=BVkFVU4dZxcoBM:)

WBN8AKHTJACP4QiR4IlwI&biw=1333&bih=643#imgrc=BVkFVU4dZxcoBM:

4.1 If the internal dimensions of the packaging box is length = 45cm, width = 45cm and height = 25 cm, calculate the volume of the box. (2)

(volume of rectangular prism = length x width x height)

4.2 The Distribution Manager tells the packaging manager that 170 bottles can be packed per box (standing upright). Is the manager correct? Justify showing detailed calculations. (4)

4.3 Calculate the volume(in litres) of water contained in one box. (3)

4.4 Three flavours of water, lemon, apple and naartjie, are packaged in the box in the ratio 2:3:5.

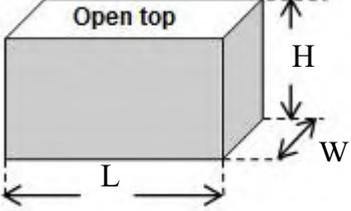
4.4.1 How many apple flavoured bottles of water are in the box? (4)

4.4.2 What is the probability of choosing a lemon flavoured bottle of water from the box? (2)

QUESTION 3 MJ 17

3.1

Rian has a factory that manufactures rectangular plant boxes with different sizes.

<p><b>PICTURE OF RECTANGULAR PLANT BOXES</b></p> 	<p><b>DIAGRAM OF THE BOX</b></p> 
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A table showing boxes with different sizes (all external dimensions in mm):

TYPE OF PLANT BOX	LENGTH (L)	WIDTH (W)	HEIGHT (H)
A	325	325	225
B	325	325	325
C	600	325	600
D	1 200	325	462,5
E	1 500	475	462,5

You may use the following formulae:

**Area of a rectangle = length × width**

**Volume of a rectangular prism = length × width × height**

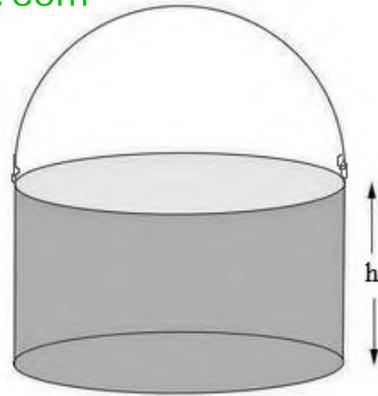
- 3.1.1 Write down the letter (A–E) of the type of plant box that is a cube. (2)
- 3.1.2 Calculate the area (in cm<sup>2</sup>) of the base of box **D**. (4)
- 3.1.3 The area of the base of box **A** is 1 056,25 cm<sup>2</sup>. Determine the total area (in cm<sup>2</sup>) needed to store 24 of these boxes if they are stacked on top of each other in a double layer. (3)
- 3.1.4 Determine, for box type **C**, the ratio of the length of the box to the width of the box in simplified form. (3)
- 3.1.5 A municipality bought 148 type **E** boxes. The inside volume of a type **E** box is approximately 0,299 m<sup>3</sup>. They also ordered compost to fill these boxes. The compost is delivered in 6 m<sup>3</sup> truckloads.
  - (a) The inside volume of a box is 9,36% less than the outside volume. Show how the approximated inside volume was calculated. (5)
  - (b) Calculate the number of boxes that can be filled with 6 cubic metres of compost. (3)
  - (c) Determine the minimum number of truckloads of compost required to fill ALL the boxes. (3)

3.2

A  $20\,000\text{ cm}^3$  cylindrical bucket has a diameter of  $10\frac{1}{2}$  inches.

**NOTE:**

1 inch = 2,54 cm



3.2.1 Determine the radius (in inches) of the cylindrical bucket. (2)

3.2.2 Determine the height (in cm) of the cylindrical bucket.

You may use the following formula:

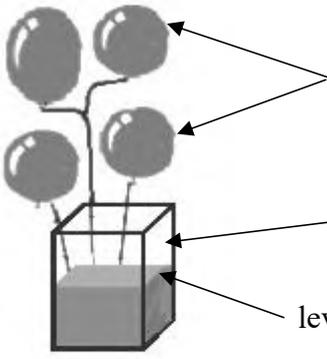
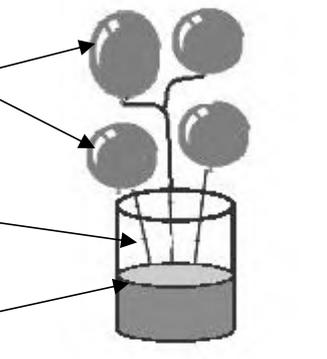
$$h = \frac{\text{Volume (in cm}^3\text{)}}{\frac{1}{4} \times \pi \times (\text{diameter in cm})^2} \text{ using } \pi = 3,142$$

(3)  
[28]

3.1 Happy Life High School makes table centrepieces, each consisting of four balloons in a vase filled with sand, for the 2017 Ball.

The school expects 240 people at the ball. Each table will accommodate a maximum of 8 people and ONE centrepiece will be placed on each table.

The diagrams below show the two types of centrepieces that will be used.

<p><b>RECTANGULAR VASE</b></p>  <p>Dimensions of rectangular vase:                  Length = 10 cm                  Width = 6 cm                  Height = 28 cm</p>	<p><b>CYLINDRICAL VASE</b></p>  <p>Dimensions of cylindrical vase:                  Diameter = 12 cm                  Height = 28 cm</p>
---	--

[Adapted from google.com]

Use the information above to answer the questions that follow.

3.1.1 Calculate the minimum number of balloons required for all the centrepieces. (2)

3.1.2 Each vase will have a decorative ribbon around it. The ribbon will overlap 1 cm.

Calculate the minimum length of decorative ribbon needed to decorate ONE rectangular vase.

You may use the following formula:

$$\text{Length of decorative ribbon (in cm)} = 2 \times (\text{length} + \text{width}) + 1 \quad (3)$$

3.1.3 Calculate (in  $\text{cm}^3$ ) the volume of the cylindrical vase.

You may use the following formula:

$$\text{Volume of a cylinder} = \pi \times (\text{radius})^2 \times \text{height}, \text{ using } \pi = 3,142 \quad (3)$$

3.1.4 The volume of the rectangular vase is  $1\,680 \text{ cm}^3$ .

- 45% of the vase will be filled with sand.
- The mass of  $1 \text{ cm}^3$  of sand is 1,53 g.

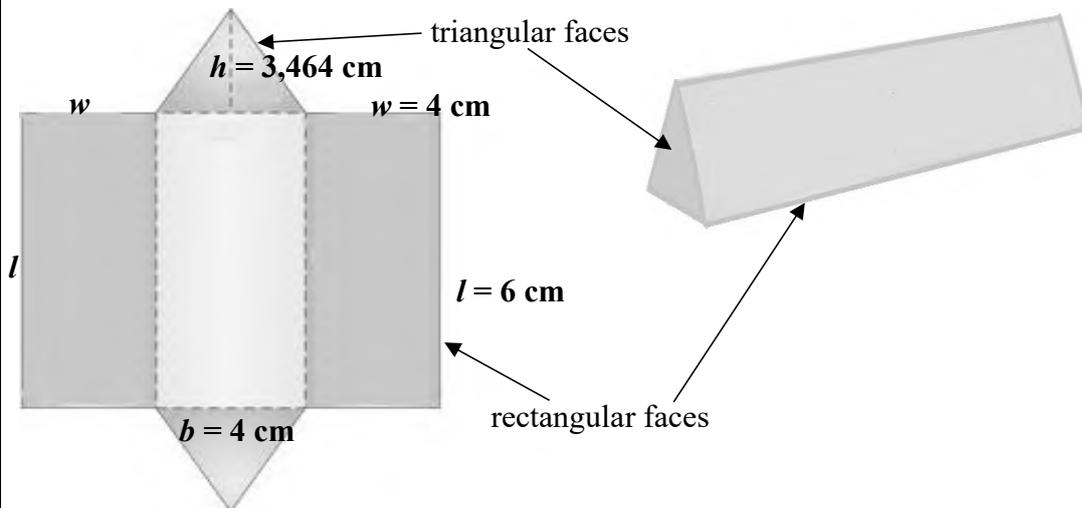
Calculate (in kg, rounded off to TWO decimal places) the mass of sand required for ONE rectangular vase. (4)

3.2

The ladies attending the ball will each receive a triangular shaped gift box. The box is made up of three identical rectangular faces and two identical triangular faces, as shown in the diagrams below. Each box will be covered in gold foil.

**Net of triangular-shaped gift box**

**Picture of triangular-shaped gift box**



Dimensions of rectangular faces:

- Length ( $l$ ) = 6 cm
- Width ( $w$ ) = 4 cm

Dimensions of triangular faces:

- Base ( $b$ ) = 4 cm
- Height ( $h$ ) = 3,464 cm

3.2.1 Calculate (in  $\text{cm}^2$ ) the area of ONE triangular face of the gift box.

You may use the following formula:

$$\text{Area of a triangle} = \frac{1}{2} \times \text{base} \times \text{height} \quad (3)$$

3.2.2 Hence, determine the total surface area (in  $\text{cm}^2$ ) of the box.

You may use the following formula:

$$\begin{aligned} \text{Total surface area of a triangular prism} \\ = 2 \times (\text{area of triangular face}) + 3 \times \text{length} \times \text{width} \end{aligned} \quad (4)$$

3.2.3 It takes 30 minutes to cover 20 boxes with foil.

Calculate (in seconds) the average time it will take to cover ONE box with foil.

(2)  
[21]

3.1 A nurse from Port Allen Clinic conducts road shows to demonstrate the use of growth charts to parents. She uses a weight-for-age chart for boys as on ANNEXURE A, which shows the recorded measurements of a boy for three visits.

Use ANNEXURE A to answer the questions that follow.

3.1.1 Identify the age group represented on this chart. (2)

3.1.2 Give the boy's weight at his first visit. (2)

3.1.3 Determine the boy's age (in months) during a visit when he weighed a little less than 9 kg. (2)

3.1.4 The boy's first visit was in May.

Determine the month in which the third visit took place. (2)

3.1.5 During the fourth visit, the boy weighed 11,2 kg and his body mass index (BMI) was calculated as 19,5 kg/m<sup>2</sup>.

Calculate the boy's corresponding height (in metres) rounded off to THREE decimal places.

You may use the following formula: 
$$\text{BMI} = \frac{\text{weight (in kg)}}{(\text{height in m})^2}$$
 (4)

3.2 The nurse uses a sedan vehicle to travel. The fuel consumption of her vehicle is 7,6 litres per 100 km travelling at an average speed.

[Adapted from [m.automobilio.info](http://m.automobilio.info)]

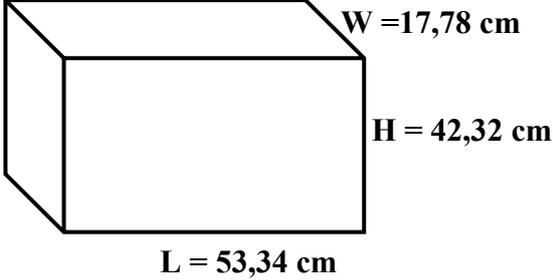
3.2.1 Calculate (to the nearest km) the distance her vehicle can travel using 55 litres of petrol. (3)

3.2.2 The nurse spends 1 hour and 45 minutes on a particular day driving between two workstations that are 189 km apart. Determine the average speed of the vehicle.

You may use the following formula: 
$$\text{Average speed} = \frac{\text{distance}}{\text{time}}$$
 (3)

3.3

The dimensions (in centimetres) of a nurse's rectangular medicine box are given below.

RECTANGULAR MEDICINE BOX	DIMENSIONS OF THE MEDICINE BOX WITHOUT THE HANDLE
 <p data-bbox="464 880 727 909">[Source: <a href="https://www.amazon.co.uk">Amazon.co.uk</a>]</p>	 <p data-bbox="751 656 895 763">L = length W = width H = height</p> <p data-bbox="751 801 855 835"><b>NOTE:</b></p> <p data-bbox="751 875 994 909">1 litre = 1 000 cm<sup>3</sup></p>

3.3.1 Calculate the volume (to the nearest litre) of ONE medicine box excluding the handle.

You may use the following formula:

$$\text{Volume} = \text{length} \times \text{width} \times \text{height} \quad (4)$$

3.3.2 The medicine box contains FOUR identical smaller boxes. EACH small box contains four different types of pills in cylindrical containers which are labelled A, B, K and U, as shown below.



[Source: [Forgetting The Pill.com](https://www.forgettingthepill.com)]

Determine (as a decimal fraction) the probability of randomly selecting a type U container from the medicine box.

(3)  
[25]

QUESTION 3 MJ 18

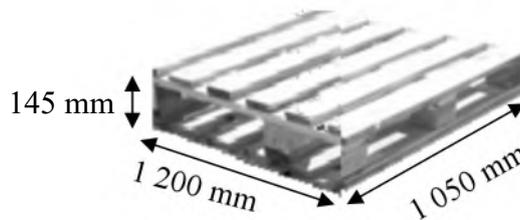
3.1 Olwethu intends opening a coffee shop. She wants to use tables made with pallets similar to the one in the picture below. Each table will have two pallets attached to legs with wheels. A piece of glass will be placed on the table surface.

The dimensions of each pallet are 1 200 mm × 1 050 mm × 145 mm.

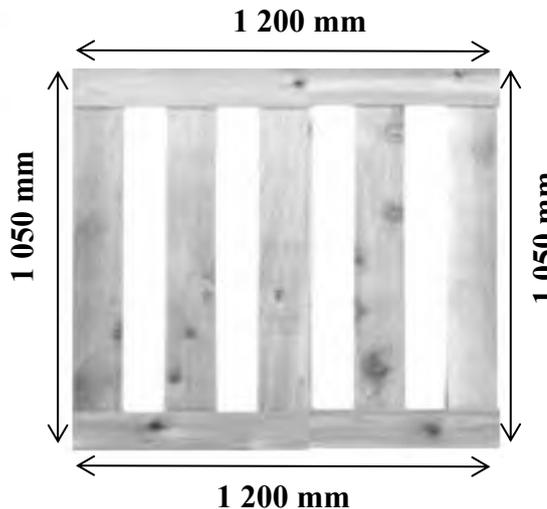
**PHOTOGRAPH OF PALLET TABLE**



**SIDE VIEW OF ONE PALLET**



**TOP VIEW OF PALLET**



[Adapted from [www.pinterest.com](http://www.pinterest.com)]

Use the information and photographs above to answer the questions that follow.

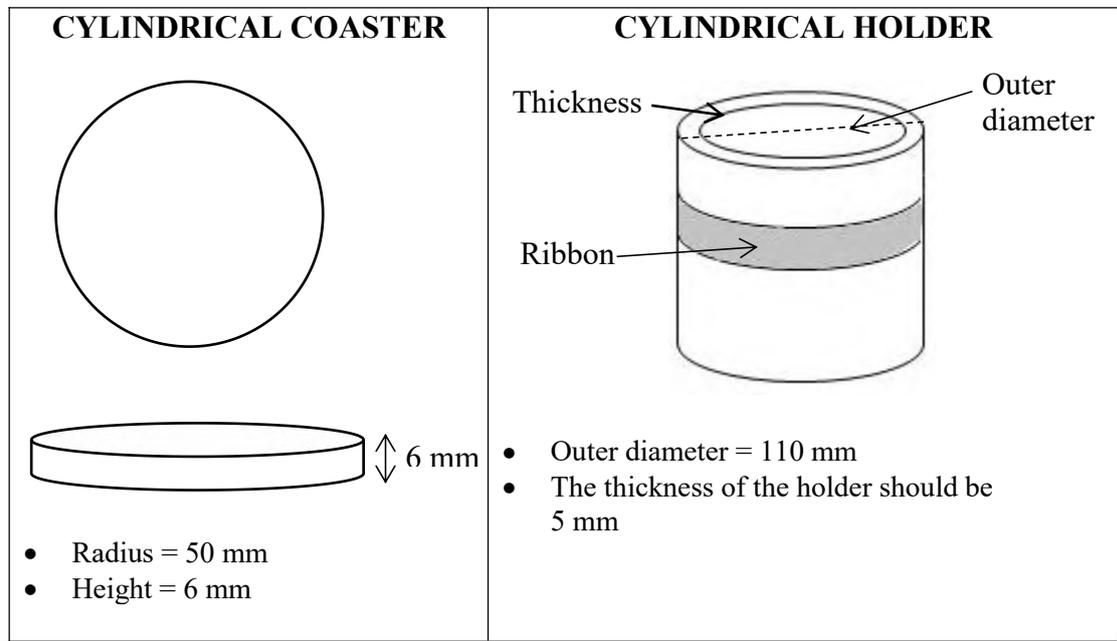
- 3.1.1 Calculate the number of pallets needed to produce 12 tables. (2)
- 3.1.2 Calculate the total height of the table, excluding the glass top, if the leg, including the wheel, is 200 mm high. (3)
- 3.1.3 Calculate the area (in mm<sup>2</sup>) of the glass top.  
You may use the formula:  
**Area = length × width** (3)
- 3.1.4 For safety reasons a rubber strip will be placed around the edge of the glass top.  
Calculate the total length (in mm) of rubber required for this purpose. (3)

3.2

Olwethu has seen a cylindrical holder which can be used to store **coasters**. A **coaster** is a small tray or mat to place under a glass to protect the table from moisture.

Each coaster has a radius of 50 mm and a height of 6 mm.

Each holder can accommodate exactly 8 coasters with no space at the top. The holder is made of plastic material, 5 mm thick.



[Adapted from [www.pinterest.com](http://www.pinterest.com)]

Use the information above to answer the questions that follow.

3.2.1 The holder will have a decorative ribbon around it. The ribbon will be 2 cm longer than the circumference of the holder so that a bow can be tied in the ribbon.

Calculate the total length (in cm) of ribbon needed for one holder.

You may use the following formula:

**Total length of ribbon =  $\pi \times \text{diameter} + \text{overlap}$** , and using  $\pi = 3,142$  (4)

3.2.2 (a) Write down the inner radius (in mm) of the cylindrical holder. (2)

(b) Hence, calculate the space needed in the holder to fit exactly 8 coasters.

You may use the following formula:

**Volume of cylinder =  $\pi \times \text{radius}^2 \times \text{height}$** ; and using  $\pi = 3,142$  (4)  
**[21]**

3.1 Liam and Amy are planning their wedding. Amy wants a four-layer red velvet wedding cake. She must still decide between a cylindrical or rectangular cake as shown on ANNEXURE B.

Use ANNEXURE B to answer the questions that follow.

3.1.1 Determine the total height of the cylindrical cake in millimetres. (3)

3.1.2 The base (bottom) layer of the cylindrical cake has a radius of 14 cm.

(a) Determine the diameter of the base layer in cm. (2)

(b) Calculate the volume (in cm<sup>3</sup>) of the base layer.

You may use the following formula:

$$\text{Volume of a cylinder} = \pi \times (\text{radius})^2 \times \text{height, and using } \pi = 3,142 \quad (3)$$

3.1.3 Define the term *perimeter*. (2)

3.1.4 Calculate the area (in cm<sup>2</sup>) of the base of the pan needed to bake the top layer of the rectangular cake.

You may use the following formula:

$$\text{Area} = \text{length} \times \text{width} \quad (2)$$

3.2 Aunt Abby will bake the wedding cake. She will be using a recipe from a recipe book published in England.

**NOTE:**

- 1 kg = 2,25 pounds
- 1 mℓ flour = 0,7 g flour

3.2.1 Aunt Abby needs 3 and a half pounds of butter.

Determine the mass of butter, in kilogram. (2)

3.2.2 Aunt Abby only has a kitchen scale available.

If aunt Abby needs 625 mℓ of flour, determine the mass of the flour in grams. (2)

3.2.3 The cake must be baked at 356 °F.

Determine to what degree Celsius the oven should be turned.

You may use the following formula:

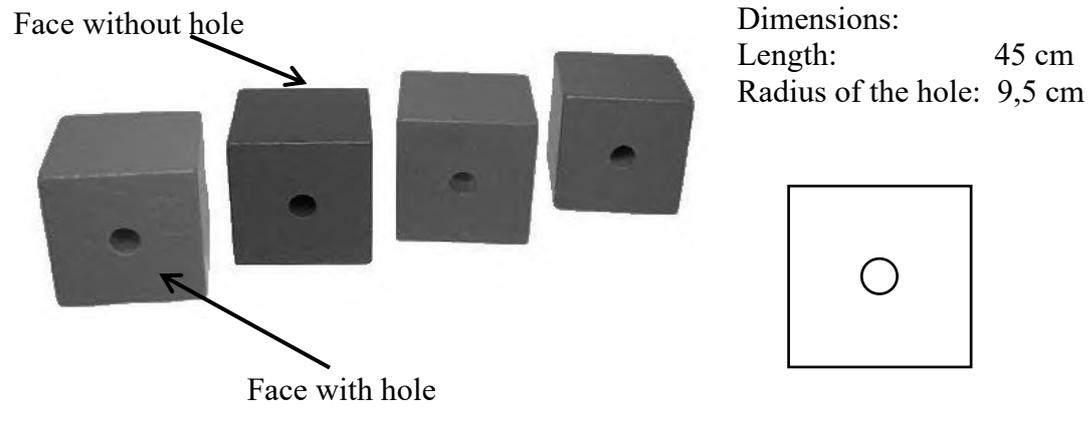
$$^{\circ}\text{C} = (^{\circ}\text{F} - 32^{\circ}) \div 1,8 \quad (2)$$

**[18]**

QUESTION 3 (19)

3.1

The Bambanani Crèche in Bethlehem bought the cubic blocks below from an auction. They have a side length of 45 cm. On two opposite sides of the block is a circular hole in the face of the block. They want to use the blocks as chairs for the children.



3.1.1 They intend painting the chairs green with Dulux all-purpose paint.

- (a) Calculate the area (in  $\text{cm}^2$ ) of ONE of the faces of the block that does not have a circular hole.

You may use the following formula:

$$\text{Area of square} = \text{side} \times \text{side} \quad (2)$$

- (b) Show that the total surface area (area of the faces with circular holes + area of the faces without circular holes) =  $11\,582,869 \text{ cm}^2$ .

You may use the following formula:

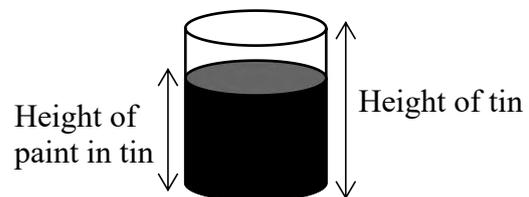
$$\text{Area of circle} = \pi \times \text{radius}^2, \text{ and using } \pi = 3,142 \quad (5)$$

- (c) The paint has a spread rate of  $1,8 \text{ ml}$  of paint per  $15 \text{ cm}^2$ .

Calculate the total amount of paint, rounded to the nearest litre, needed to paint 12 chairs with ONE coat of paint. (4)

3.1.2 The paint is sold in  $5 \text{ l}$  tins. Each tin has a radius of  $7 \text{ cm}$  and a height of  $35 \text{ cm}$ .

$$5 \text{ l} = 5\,000 \text{ cm}^3$$



- (a) Write down the diameter of the tin. (2)
- (b) Calculate the height of the paint in the tin:

You may use the following formula:

$$\text{Volume of a cylinder} = \pi \times (\text{radius})^2 \times \text{height}, \text{ where } \pi = 3,142 \quad (3)$$

3.2

The waist-to-hip ratio (WHR) is another way of determining the disease risk related to obesity.

You may use the following formula:

$$\text{Waist-to-hip ratio} = \frac{\text{waist measurement}}{\text{hip measurement}}$$

Once the calculation is done, a person's disease risk related to obesity is classified as low, moderate, high or very high, based on their age.

**DISEASE RELATED TO OBESITY**

	AGE GROUP	CLASSIFICATION			
	(YEARS)	LOW	MODE-RATE	HIGH	VERY HIGH
<b>MEN</b>	20–29	<0,83	0,83–0,88	0,89–0,94	>0,94
	30–39	<0,84	0,84–0,91	0,92–0,96	>0,96
	40–49	<0,88	0,88–0,95	0,96–1,00	>1,00
	50–59	<0,90	0,90–0,96	0,97–1,02	>1,02
	60–69	<0,91	0,91–0,98	0,99–1,03	>1,03
<b>WOMEN</b>	20–29	<0,71	0,71–0,77	0,78–0,82	>0,82
	30–39	<0,72	0,72–0,78	0,79–0,84	>0,84
	40–49	<0,73	0,73–0,79	0,80–0,87	>0,87
	50–59	<0,74	0,74–0,81	0,82–0,88	>0,88
	60–69	<0,76	0,76–0,83	0,84–0,90	>0,90

[Adapted from *Champaign IL, Human Kinetics, 1999, p82*]

Use the information above to answer the questions that follow.

3.2.1 Determine if a 37-year-old man with a WHR of 0,95 has a moderate or a high risk of obesity. (2)

3.2.2 A 50-year-old man has the following measurements:

waist = 105 cm ; hip = 92 cm

Calculate this man's WHR. (2)

3.2.3 A woman with a waist of 72 cm has a WHR equal to 0,7826 and is classified as a moderate risk.

(a) State ONE possible age group of this woman. (2)

(b) Calculate the woman's hip measurement. Round off your answer to the nearest cm. (3)

[26]

**Make sure you are able to:**

- Use given scale to determine distances on given maps or plans
- Determine a scale for a given plan or map;
- Use grids and maps in order to determine locations in a familiar context, applying routine procedures;
- Locate positions on maps or plans
- Describe routes using plans or maps
- Draw simple scale drawings where the scale is given and based on the application of simple routine procedures in a familiar context

**MAPS AND SCALES**

- When dealing with this section, make sure that you are able to do accurate measurement and conversions.
- You must also be able to use compass directions.

**SCALES**

**There are 2 types of scales that are used when dealing with maps:**

**1. Bar scale**

- This is not affected by the resizing of the map
- Measure the bar scale to determine the distance given
- Equate the distance measured to the value on the bar scale
- Convert units to be similar
- Convert the relationship to number scale

**2. Number scale**

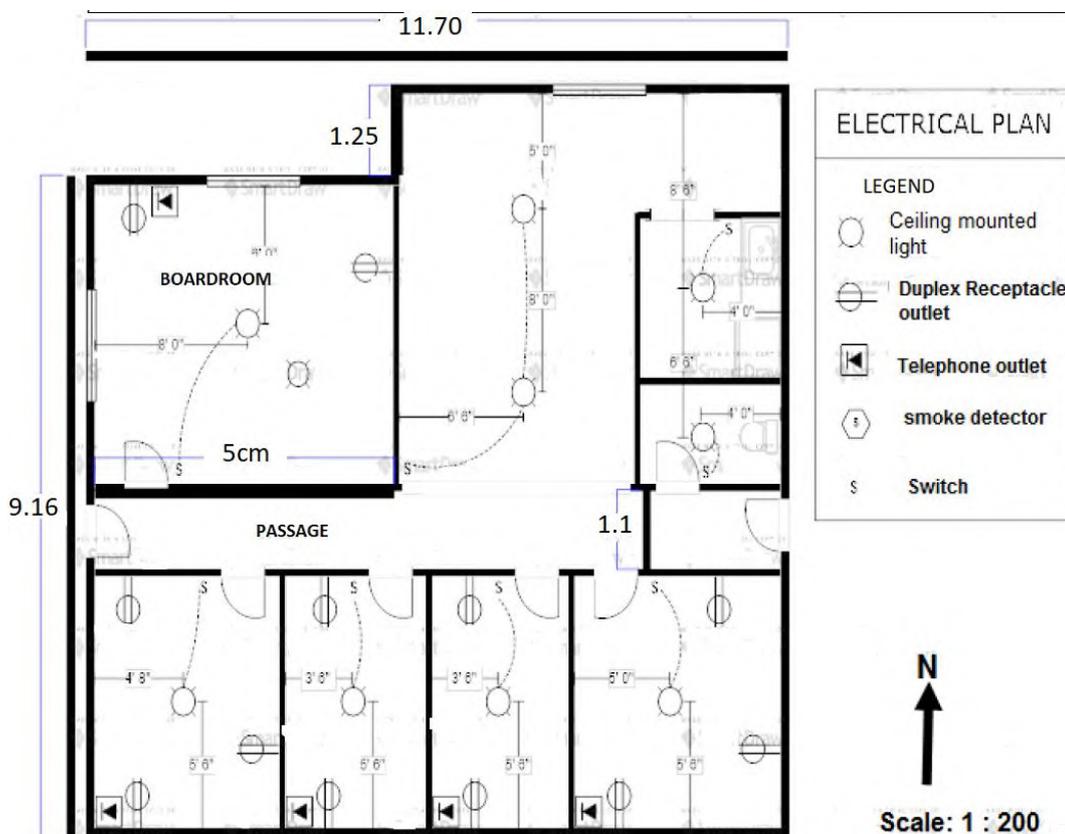
- Resizing of the map affects the number scale
- Gives the measure on the map to the actual distance on the ground
- Use the ruler to measure the length on the map
- Equate the measured length to the actual distance on the ground

**NB:**

- If the scale is expressed as a ratio like 1:100, it means that 1 unit on the plan will represent 100 units on the ground.
- Using a number scale:
  - use a ruler to measure the distance on the plan
  - multiply the real part of the ratio by the distance measured to get the real distance
  - e.g.: You measure 80 mm on the plan.  
Real distance:  $80 \text{ mm} \times 100 = 8 \text{ m}$
- Identify all the features on the plan.

**Worked Example 1**

A floor plan for offices is given below. The length of the building on the plan is 11.70 cm and the width is 10.40 cm. An electrical plan is also attached to the floor plan. Use the information on the floor plan to answer the following questions



1.1 How many telephone outlets are in the building? (2)

**Five telephone outlets ✓✓**

**Fully drawn floor plans have legends/key i.e. symbols representing where the various items in the house are. The symbol for the telephone appears in the Boardroom and the four office spaces**

1.2 Write down the ratio of the outside doors to the inside doors in simplest form. (3)

**2 ✓ : 6 ✓ = 1 : 3 ✓**

**Ratio is for comparing values. The number of the outside door to the number of the outside doors in that order**

1.3 Explain the meaning of the scale 1:200 on the plan. (2)

**1 unit on the plan equals 200 units in real life. ✓ ✓**

1.4 Use the given scale to determine the actual dimensions of the building. (3)

**Length: 11,70: ?**

**1 : 200**

**$11,70 \times 200 \checkmark = 2\ 340\ \text{cm} \checkmark$**

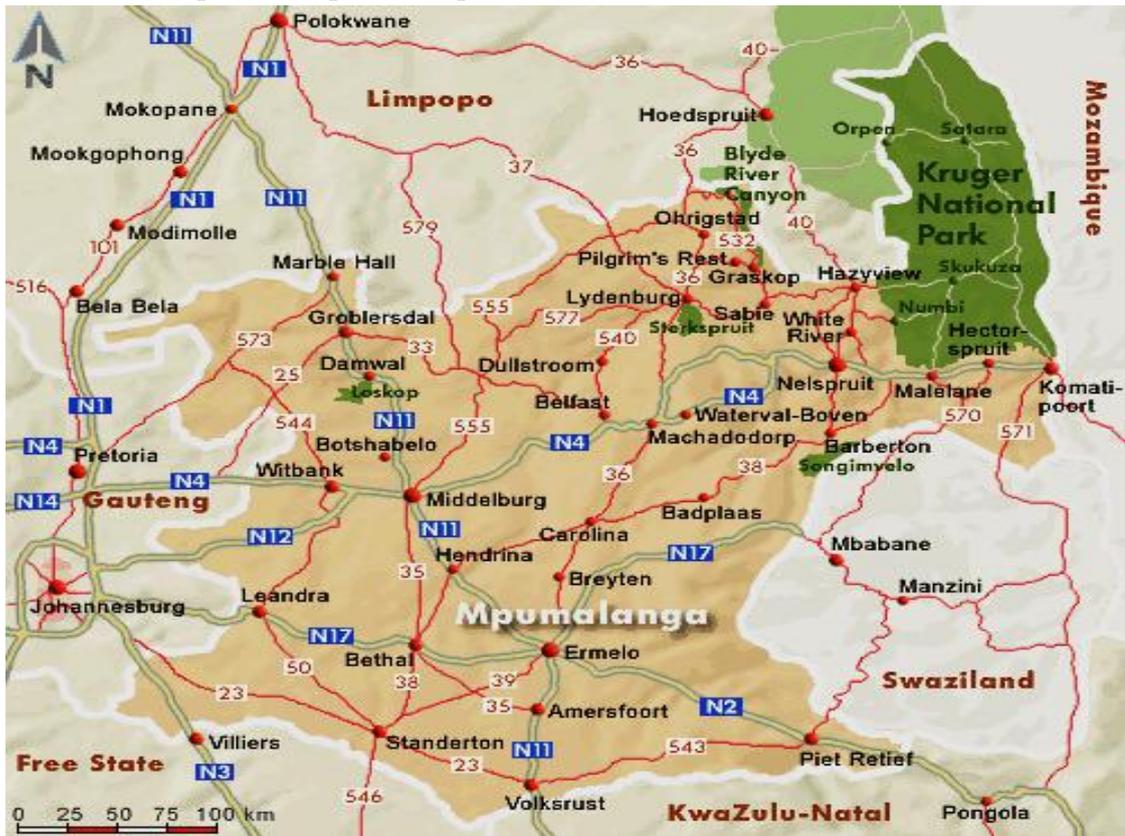
**Width :  $10,40 \times 200 = 2\ 008\ \text{cm} \checkmark$**

1.5 What is the probability of finding a window on the eastern wall of the offices? (2)

**P( finding a window on the Eastern wall) = 0 ✓✓**

**Worked Example 2**

Saloshni lives in Mokopane in Limpopo and plans to visit her relatives in Volksrust, Mpumalanga. She used the map below to plan the trip.



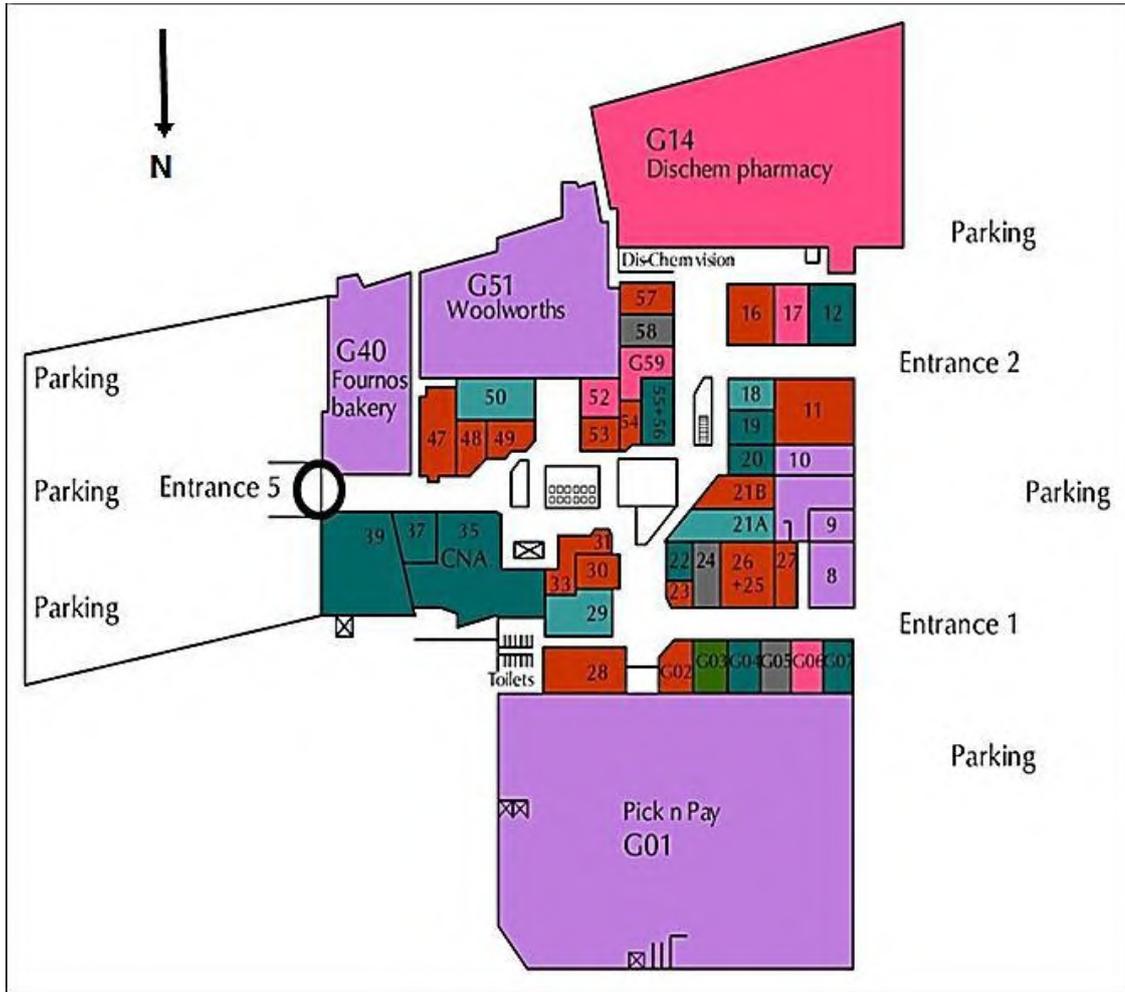
[Source: Google Maps]

- 2.1 Write the national route she can use to travel to Volksrust. (2)  
**N11✓✓**
- 2.2 Write down three possible major towns where Kate can stop on her journey to Volksrust. (3)  
**Groblersdal✓, Middelburg✓and Ermelo✓**
- 2.3 Explain what the bar scale on the map indicates. (3)  
**The bar scale measures 2 cm✓, hence 2cm on the map represents 100 km in real life. ✓✓**
- 2.4 Use the bar scale to determine the straight distance from Mokopane to Volksrust. (4)  
**Straight distance: 8 cm✓**  
**Scale : 2 cm : 100 km✓**  
 **$8 \times 100 / 2 \checkmark = 400 \text{ km} \checkmark$**

**Activities : MEASUREMENTS**

**Activity 1**

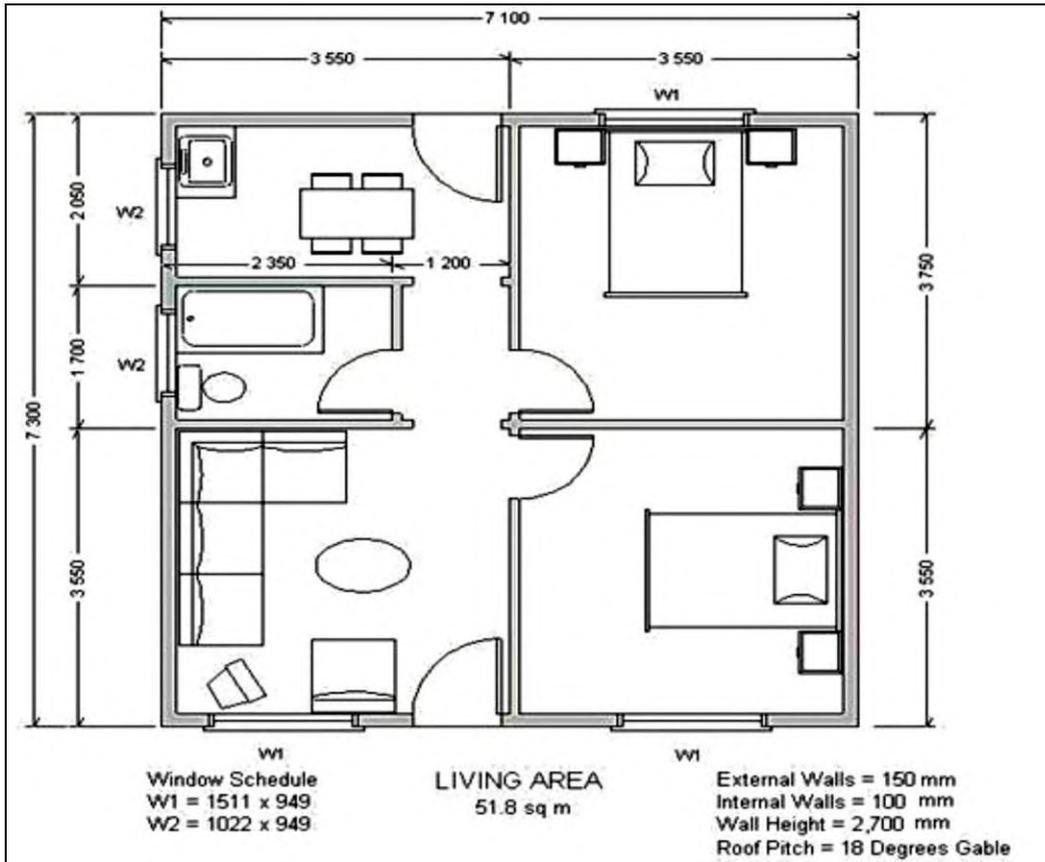
Below is a layout of a plan of a mall. Study it carefully to answer the questions below.



- 1.1 Name the biggest shop that you will pass first if you enter the Mall through Entrance 1. (2)
- 1.2 Name the entrance point(s) situated on the west side of the mall. (2)
- 1.3 What is the general position of shop G14 with reference to shop 35? (2)
- 1.4 You are a car guard on the parking where there is Entrance 5 assisting a customer with directions to the toilet facilities. Give him directions to the toilets if he enters through Entrance 5. Include compass directions in your explanations. (5)

**Activity 2**

Below is a floor plan of an RDP house which can be used to answer the question below.

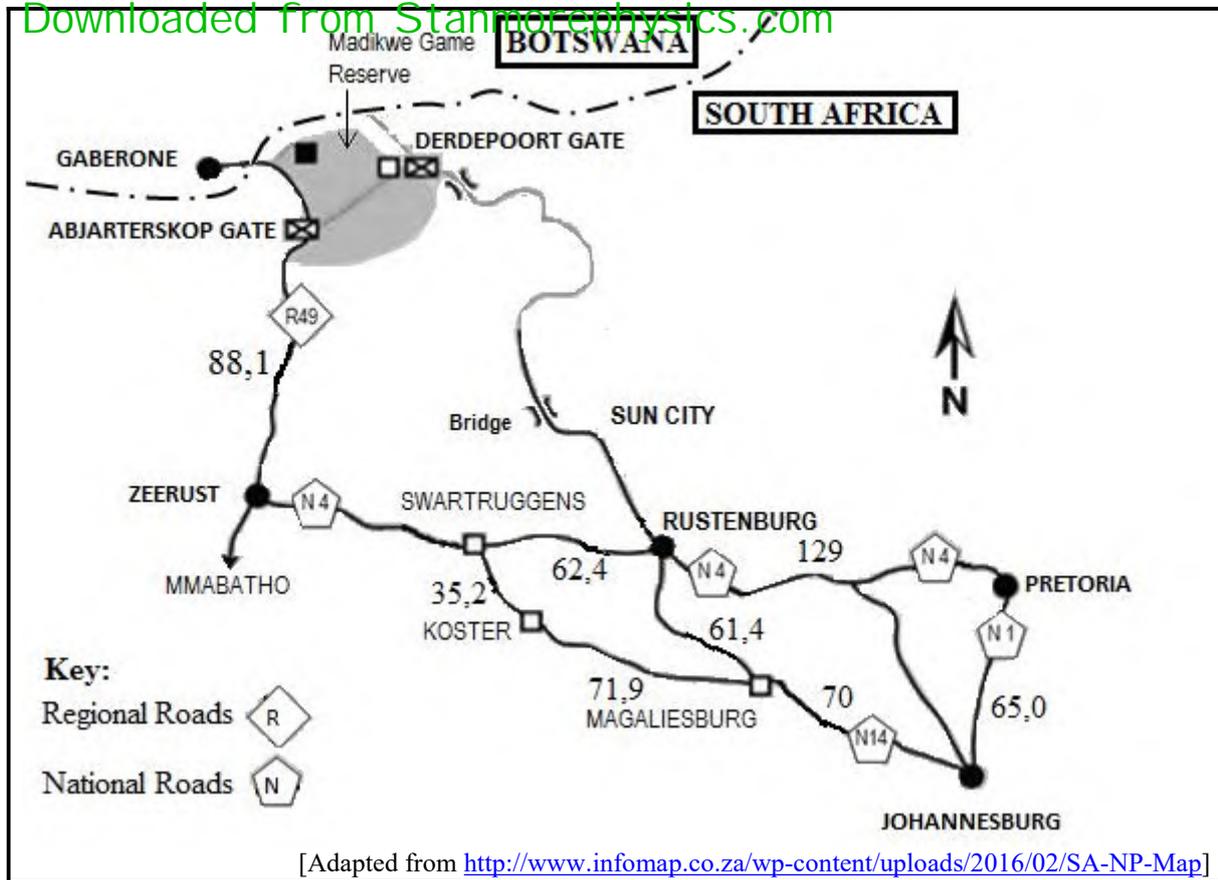


[Source: moladi.com/Lightweight-Construction-Method.htm]

- 2.1 How many windows are shown on the plan? (2)
- 2.2 How many doors are shown on the plan? (2)
- 2.3 What is the probability of finding a door that opens towards the left in the plan from outside? Give your answer as a decimal. (3)
- 2.4 If the outside wall of the bathroom measures 34mm on plan, determine the scale of the RDP floor plan. (3)

**QUESTION 4 MJ 17**

- 4.1 A group of tourists drove from Johannesburg to the Madikwe Game Reserve and planned to enter the game reserve at the Abjarterskop Gate.  
 Below is a map indicating the routes, cities or towns and distances (in kilometres) between the places.  
**ROUTE MAP FROM JOHANNESBURG TO THE MADIKWE GAME RESERVE**



Use the information and the route map above to answer the questions that follow.

- 4.1.1 Give the general direction of the Madikwe Game Reserve from Johannesburg. (2)
- 4.1.2 State what the broken line (---) represents on the map. (2)
- 4.1.3 Name the shortest route that could be used to drive from Johannesburg to the Abjaterskop Gate. (3)
- 4.1.4 Calculate the distance between Zeerust and Swartruggens if the total route distance from Rustenburg to the Abjaterskop Gate is 221,2 km. (3)
- 4.1.5 Determine the shortest route distance from Johannesburg to Swartruggens. Show ALL calculations. (3)

4.2 The group of tourists also visited the Kgalagadi Transfrontier Park. The layout plan of the Twee Rivieren Camp is given in ANNEXURE C.

This camp offers two types of accommodation:

- Camping facilities (for tents)
- Cottages

Use the layout plan on ANNEXURE C and the information above to answer the questions that follow.

- 4.2.1 Identify on which side of the road they will find the reception building after they entered the gate. (2)
- 4.2.2 If each of the cottages can accommodate 3 guests, calculate the maximum number of guests that can be accommodated in ALL the cottages in the camp. (3)
- 4.2.3 Explain in detail the route a person should follow to walk from the picnic site to the swimming pool. (3)
- 4.2.4 The visitors booked a drive activity. Determine the probability that the activity booked was NOT a night drive. (2)
- [23]**

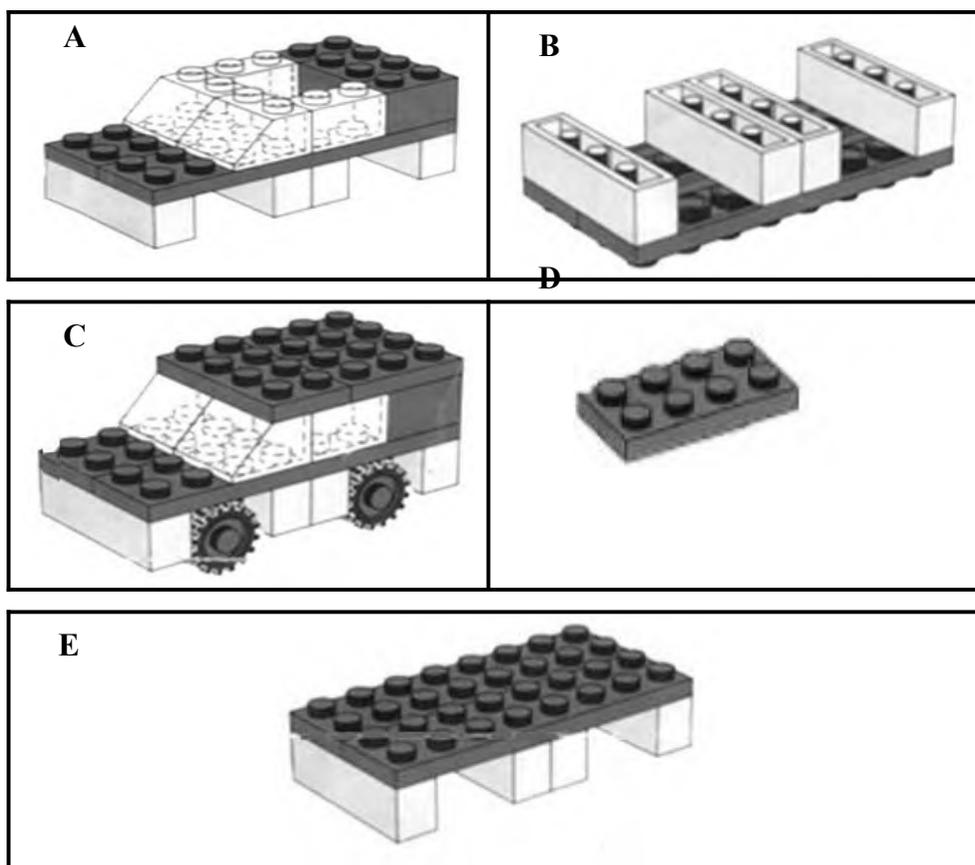
4.1 ANNEXURE B shows a route map and information regarding the 42,2 km 2017 Cape Town Marathon.

Use ANNEXURE B to answer the questions that follow.

- 4.1.1 Name the type of scale used for the route map. (2)
- 4.1.2 What type of view is represented on this route map? (2)
- 4.1.3 Name the general direction of the Groote Schuur Hospital (Tourist Attraction 10) from the starting point of the marathon. (2)
- 4.1.4 Determine the exact number of medical help points located on the route. (2)
- 4.1.5 Identify the suburbs in the vicinity of the halfway mark. (2)
- 4.1.6 Identify the tourist attractions indicated on the map between the 15 km mark and the 20 km mark. (3)

4.2

The diagrams below show a set of labelled assembly instructions (not in order of assembly) to build a toy car with Lego blocks.



[Source: [www.lego.com](http://www.lego.com)]

Study the diagrams above to answer the questions that follow.

4.2.1 Write down the correct order of the assembly instructions to build the toy car, using the letters **A**, **B**, **C**, **D** and **E**. (2)

4.2.2 Which letter (**A**, **B**, **C**, **D** or **E**) fits the instruction, 'Flip over the part-assembly'? (2)

4.2.3 A can of Lego blocks contains 20 red blocks, 25 blue blocks, 28 green blocks, 30 black blocks and 27 white blocks.

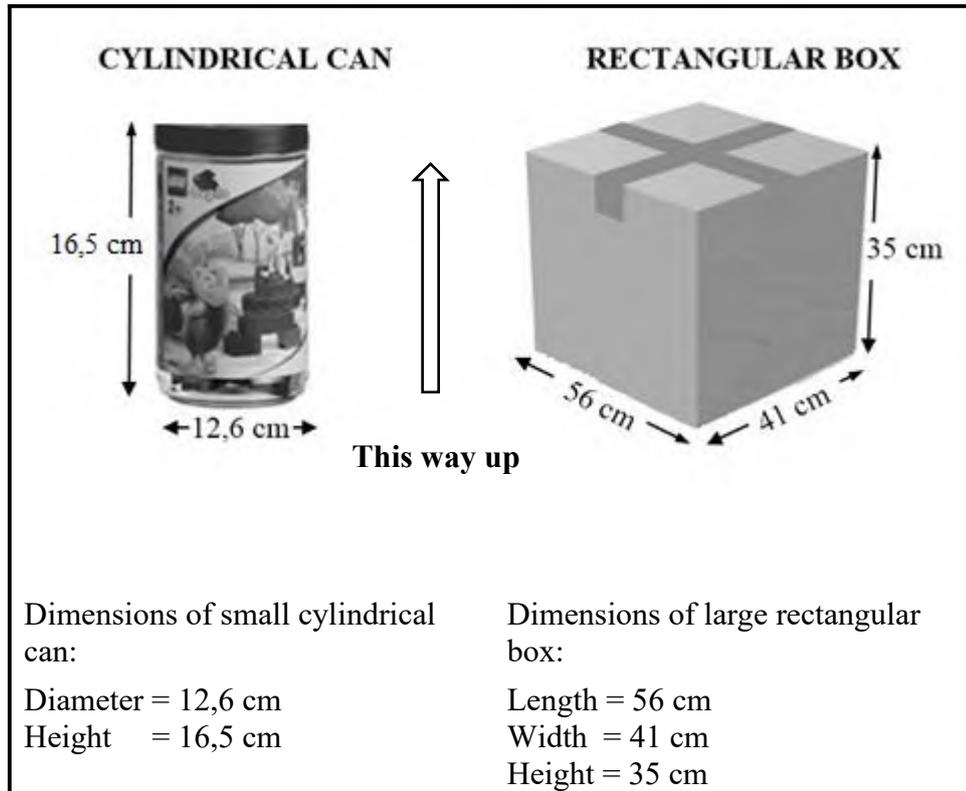
A block is randomly selected from the can.

Determine the probability that the block will be the following:

(a) Yellow (2)

(b) Blue (3)

4.2.4 The building blocks are packed into small cylindrical cans that are then packed into a large rectangular box, as shown in the diagrams below.



The cylindrical cans are placed upright in the box.

- (a) Determine the number of layers of cans that can be placed in an upright position in the box. (2)
  - (b) Hence, determine the maximum number of cans that can be packed into ONE box. (3)
- [27]**

**QUESTION 4 FM 18**

4.1 Rammone plans to travel from Colesberg to Port Elizabeth using only national roads. ANNEXURE B shows a strip chart of the route from Colesberg to Port Elizabeth.

Use ANNEXURE B to answer the questions that follow.

- 4.1.1 Name the national roads that Rammone will use to travel to Port Elizabeth. (2)
  - 4.1.2 Which national park is furthest from the N10? (2)
  - 4.1.3 Rammone met a friend in Paterson who had to travel 61 km via the R336 from his hometown. (2)
- Name the friend's hometown. (2)

4.1.4 Calculate the travel distance between the TWO national parks. (3)

4.2 Rammone visited Port Elizabeth to check on the progress made on the house being built for his parents.

ANNEXURE C shows the floor plan of the house.

Use ANNEXURE C to answer the questions that follow.

4.2.1 Give (in mm) the external length of the wall that makes the area of Bedroom 1 larger than Bedroom 2. (2)

4.2.2 Determine (in m) the total external length of the western wall of the house. (2)

4.2.3 Name the room(s) that has more than ONE entrance. (2)

4.2.4 Identify the room that has the same floor area as the living room. (2)

4.2.5 Which bathroom fixture is NOT shown on the floor plan? (2)

[19]

#### QUESTION 4 MJ 18

4.1 Crazy Daisy Coffee Shop is situated in the north wing of a shopping mall. The layout plan (drawn to scale) of the shopping mall is given in ANNEXURE B.

Use ANNEXURE B to answer the questions that follow.

4.1.1 Write down the shop number of Crazy Daisy Coffee Shop. (2)

4.1.2 State which parking area is closest to Toy World. (2)

4.1.3 Write down the name of the shop which has the biggest floor area. (2)

4.1.4 The manager of shop 18 ordered a cup of coffee and a slice of cake to be delivered by Crazy Daisy Coffee Shop.

Give the delivery man a set of directions from Crazy Daisy Coffee Shop up to the entrance of shop 18. (4)

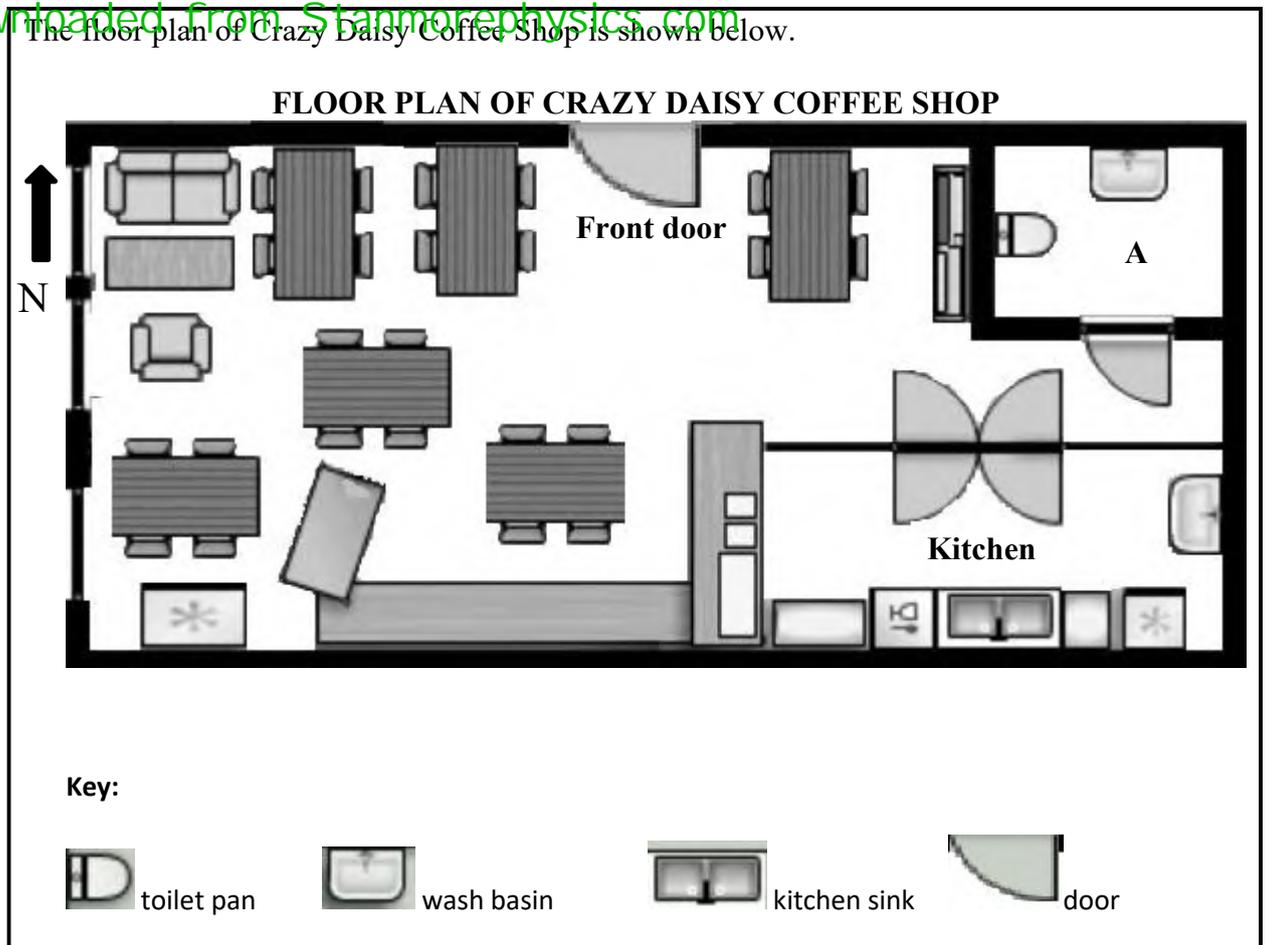
4.1.5 Calculate the total number of doors shown on this layout plan. (2)

4.1.6 Write down the probability of randomly selecting a shop that has TWO door entrances. (2)

4.1.7 Determine the probability of randomly selecting a shop that is NOT labelled with an even number. (2)

4.2

The floor plan of Crazy Daisy Coffee Shop is shown below.



[Adapted from [www.shc](http://www.shc)]

Use the floor plan above to answer the questions that follow.

- 4.2.1 Explain the meaning of the term *floor plan*. (2)
- 4.2.2 Identify the room labelled A. (2)
- 4.2.3 Give the general direction of the kitchen from the front door. (2)
- 4.2.4 The measured width of the coffee shop is 70 mm. The actual width is 15 m.  
Determine the scale (rounded off to the nearest whole number) of the floor plan. (3)
- [25]

QUESTION 4 ND 18

4.1

A parkrun is a weekly 5 km run. A group of runners drove from Upington to Springbok to take part in the weekly parkrun in Springbok.

ANNEXURE C shows a route map from Upington to Springbok.

Use ANNEXURE C to answer the questions that follow.

- 4.1.1 Give the general direction from Upington to Springbok. (2)
- 4.1.2 Write down the name of the national park close to Kamieskroon. (2)
- 4.1.3 Name TWO towns the runners will pass through on their way to Springbok, following the N14. (3)
- 4.1.4 Identify the type of scale used on the map. (2)
- 4.1.5 Use the given scale to determine the actual distance (to the nearest km) between Upington and Springbok. (4)

4.2

On arrival in Springbok the runners must first pick up Joe, a fellow runner, before heading to the parkrun (**B**).

ANNEXURE C shows a street map indicating the route from entering Springbok (**A**) to the parkrun (**B**).

Use ANNEXURE C to answer the questions that follow.

- 4.2.1 Name the road by which they will enter Springbok. (2)
- 4.2.2 Joe gives them the following directions to his home:
  - Enter Springbok from Upington.
  - Turn right into Uitspan Street.
  - Turn left into Lukhof Street.
  - Turn left into the first street.

Use the directions above to determine in which street Joe lives. (2)

- 4.2.3 Name of the lodge near the parkrun. (2)
- 4.2.4 The distance from Joe's house to the parkrun is 2,34 km. They travel at an average speed of 40 km/h.

Determine how long it will take them (in minutes) to get from Joe's house to the parkrun.

You may use the following formula:

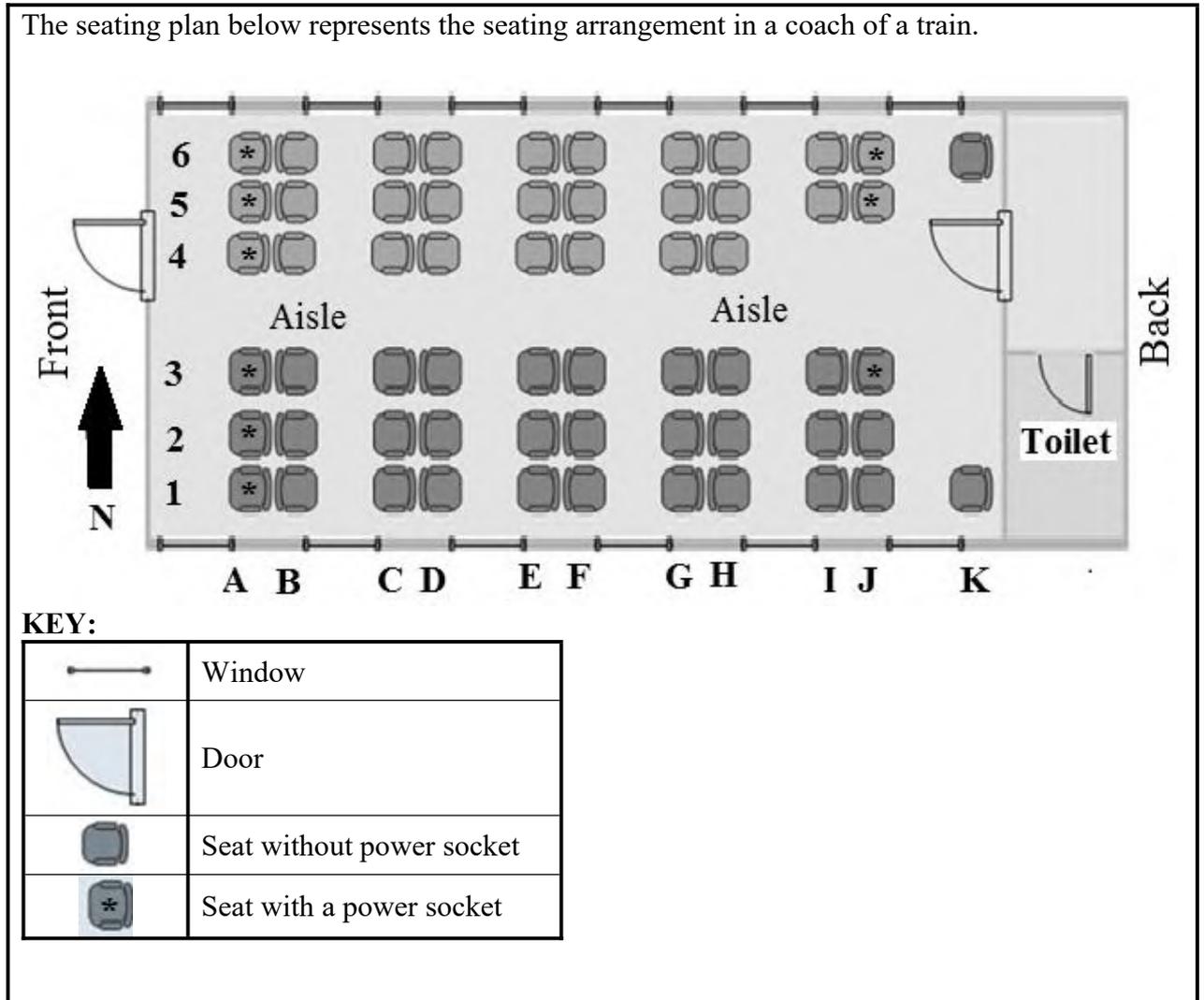
$$\text{Time} = \frac{\text{distance}}{\text{speed}} \quad (3)$$

- 4.2.5 29 of the 42 athletes who participated in the parkrun were female. Determine the probability of randomly selecting a male athlete from this group. (2)

[24]

**QUESTION 4 MJ 19**

4.1 The seating plan below represents the seating arrangement in a coach of a train.



Use the information above to answer the questions that follow.

- 4.1.1 How many passengers can be seated in ONE coach? (2)
- 4.1.2 Write down the number of the seat close to the window and the toilet. (2)
- 4.1.3 In which general direction is the toilet from seat B6? (2)
- 4.1.4 Determine the probability (as a percentage) of randomly selecting a seat with a power point in this coach. (3)
- 4.1.5 A man seated on seat J2 uses the following route to move to another seat: (2)
- From J2 turn left and walk towards the aisle
  - He turns left and continue straight until he reaches the front of the coach
  - He then turns right and sits in the middle seat

4.2

ANNEXURE C shows the map representing the routes of a South African bus company.

Use ANNEXURE C to answer the questions that follow.

4.2.1 How many airports are along the bus routes? (2)

4.2.2 Explain the meaning of the given scale. (2)

4.2.3 Calculate the actual distance, in km, from Mossel Bay to East London if the distance on the map is 60 mm. (3)

4.2.4 The bus took 7 hours 26 min to travel from Bloemfontein to Grahamstown.

Calculate the average speed (in km/hour) the bus travelled if the distance from Bloemfontein to Grahamstown is 597 km.

You may use the following formula:

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

(3)  
[21]

## DATA-HANDLING

Make sure that you are able to:

- Understand terminologies like mode, mean, range, quartiles, etc;
- Arrange data in ascending order;
- Identify the mode;
- Determine the median when data is already arranged in ascending order and  $n$  is odd ( $n = \text{number of scores}$ );
- Construct frequency tables from arranged data;
- Read information from graphs and frequency tables;
- Construct tally tables;
- Calculate mean and the range of given scores, quartiles and analyse percentiles.
- Draw graphs from given data (these graphs include pie charts, single and compound bar graphs, line and broken line graphs, and histograms)

### Notes

- **Ascending order** means we **start with the smallest number** and **end with the largest number**.
- If the **total number** of values is **Even**, the **Median**(Quartile 2) will be the **average of the two middle numbers**.
- If the **total number** of values is **odd**, the **Median**(Quartile 2) will be the **middle number of the data set**. **No calculation is needed** to find the median, **provided** that all the **data is arranged in ascending order**.
- An **Even number** means that the number is divisible by 2. If we divide it by 2, then the answer is a number without any decimal part, e.g.  $14 \div 2 = 7$
- An **Odd number** means that the number is not divisible by 2. If we divide it by 2, then the answer is a number with a fraction part, e.g.  $9 \div 2 = 4,5$
- Interquartile range:  $\text{IQR} = \text{UP} - \text{LQ}$

*The 0,5 is the fraction part*

Upper Quartile(UP): **Median** of the **Top half**

Lower Quartile(LQ): **Median** of the **Bottom half**

- **Percentile**: In statistics, *percentiles* are used to understand and interpret data. If a value falls in the 60th percentile, it means that 60% of the data is less than the value, and 40% is more than the value. The data set adds up to 100%(60% + 40%).

## 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.

## QUARTILES

- Quartiles are measures of spread dividing the data into 4 equal parts (or quarters) of 25% each.
- The lower quartile (Q1) is 25%
- The median (Q2) is 50%
- The upper quartile (Q3) is 75%

### To determine the quartiles:

- divide the information into 2 equal parts
- the median is the 2<sup>nd</sup> quartile (Q2)
- now divide the first half into 2 equal parts
- the median of the first half is the lower quartile (Q1)
- now divide the second half into 2 equal parts
- the median of the second half is the upper quartile (Q3)

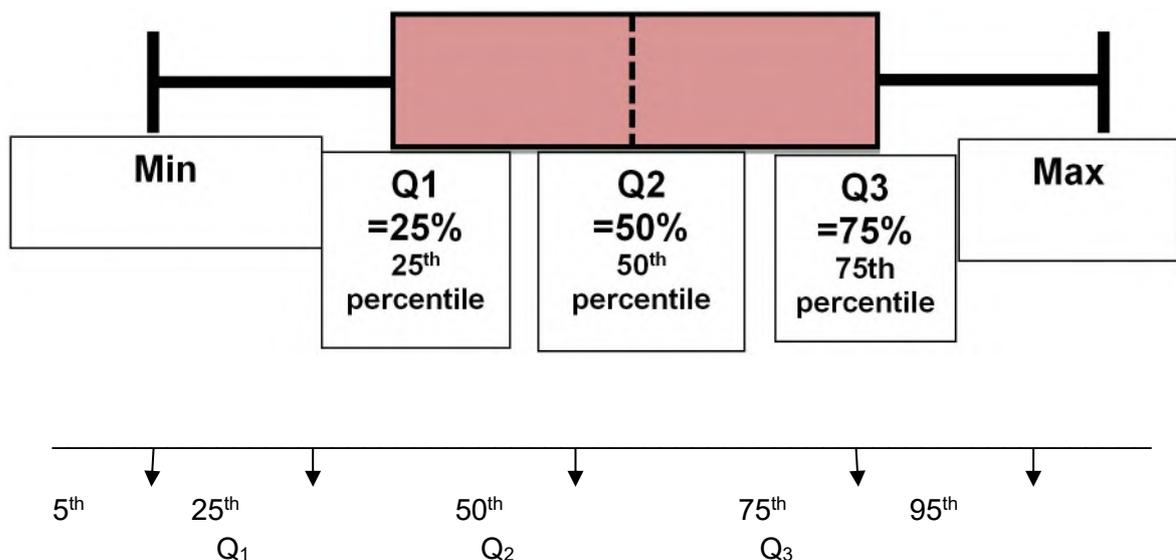
### Interquartile range

- This is the difference between the upper quartile and the lower quartile.
- This indicates the spread between the lower part of data and the upper part of data

### Percentiles

- This is the division of data into 100 equal groups.
- This is used to analyse the spread of the large sets of data.

### Percentiles can be represented as follows:



### Percentiles:

- This is the division of data into 100 equal groups. This is used to analyse the *spread* the large sets of data.
- The value at 5th percentile implies that 5% of values, lie below the 5th percentile and that 95% of the values will lie above the 5th percentile.
- The value at quartile 1, implies that 25% of the values will lie below the 25th percentile and that 75% of the values will lie above 25th percentile.
- The concept of percentiles is used in growth charts.
  - The *curve* on the growth chart represents the percentile values of the collected data from different age groups, i.e.: height, weight, BMI and head circumference.
  - The growth chart is used to compare the BMI of the child, versus the average for his age group.
  - This may be used to determine the health status of a baby.
- Mass and height are used to determine the BMI (Body Mass Index) of a person.
- The formula used to determine the BMI is :

$$\text{BMI} = \frac{\text{weight}}{\text{height}^2}$$

### Whenever drawing graphs, remember the following

- On a graph, remember to provide a heading, label both axes and fill in the relevant units where necessary.
- There are 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
- Slices of a pie chart will always total (sum) 100%.
- You are ONLY expected to interpret the box and whisker plots and not draw it
- The box and whisker plots are made up of minimum value, lower quartile, median, upper quartile and maximum value (FIVE NUMBER summary).
- Information can be given in millions, so remember to use this information when calculating.

### Worked example:

The following marks were obtained by a grade 11 Mathematical Literacy class for a test out of 100 marks:

78; 12; 16; 68; 20; 95; 35; 38; 42; 60; 82; 83

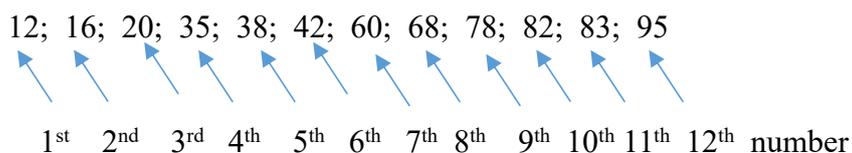
1. Calculate the median
2. Calculate the Inter-Quartile-Range
3. Study the box and whisker diagram of the results, and explain which measure provides a good indication of the learners' performance?

### Method:

- ❖ Always **arrange** the data **in ascending order first**, unless it is **already in ascending order**.
- ❖ **Check** if the **total number of values are even or odd**.

1. Arrange data in ascending order:

12; 16; 20; 35; 38; 42; 60; 68; 78; 82; 83; 95



1<sup>st</sup> 2<sup>nd</sup> 3<sup>rd</sup> 4<sup>th</sup> 5<sup>th</sup> 6<sup>th</sup> 7<sup>th</sup> 8<sup>th</sup> 9<sup>th</sup> 10<sup>th</sup> 11<sup>th</sup> 12<sup>th</sup> number

Hence the **total number of values is 12**, an **even number**. There we must find the two middle numbers and take the average.

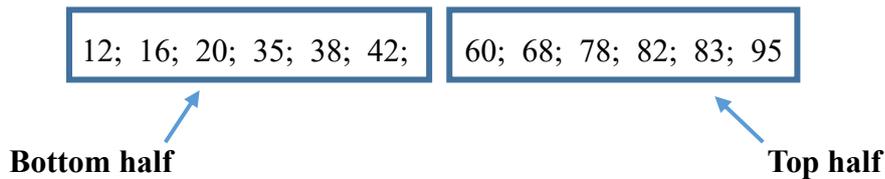
**Median:** 12; 16; 20; 35; 38; 42; 60; 68; 78; 82; 83; 95

The median is the average of the 6<sup>th</sup> and 7<sup>th</sup> numbers.

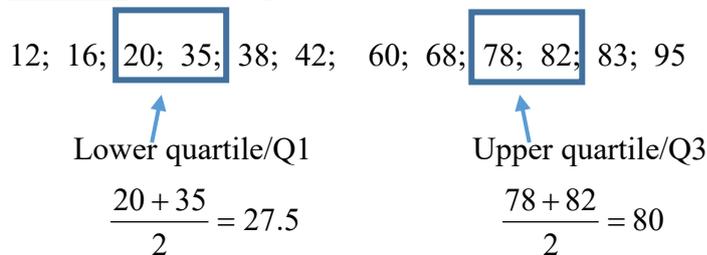
$$\text{Median: } \frac{42 + 60}{2} = 51$$

2. Interquartile range:

$$\text{IQR} = \text{UP} - \text{LQ}$$



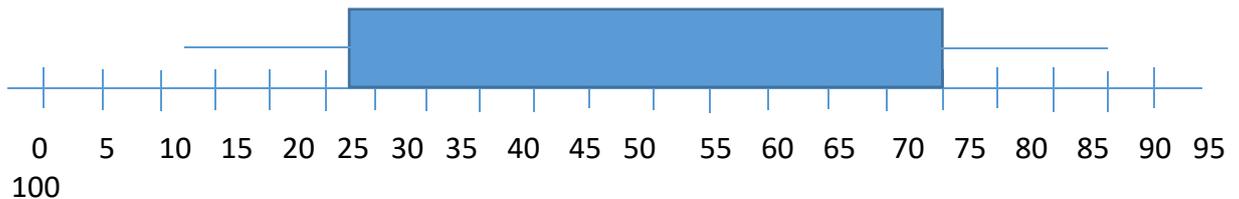
**Method:** Calculating the Quartiles



Inter quartile range(IQR)= Upper Quartile – Lower Quartile

$$\text{IQR} = 80 - 27,5 = 52.5$$

3.



The Lower quartile shows the performance of learners in the bottom half only.

The Upper quartile shows the performance of learners in the top half only.

The Inter-Quartile-Range, shows the range between the upper and lower quartiles.

The Median of 51% is simply the middle value of the data set, however it provides a more reasonable indication of the average performance since the Mean is 51.5%.

ACTIVITIES

ACTIVITY 1

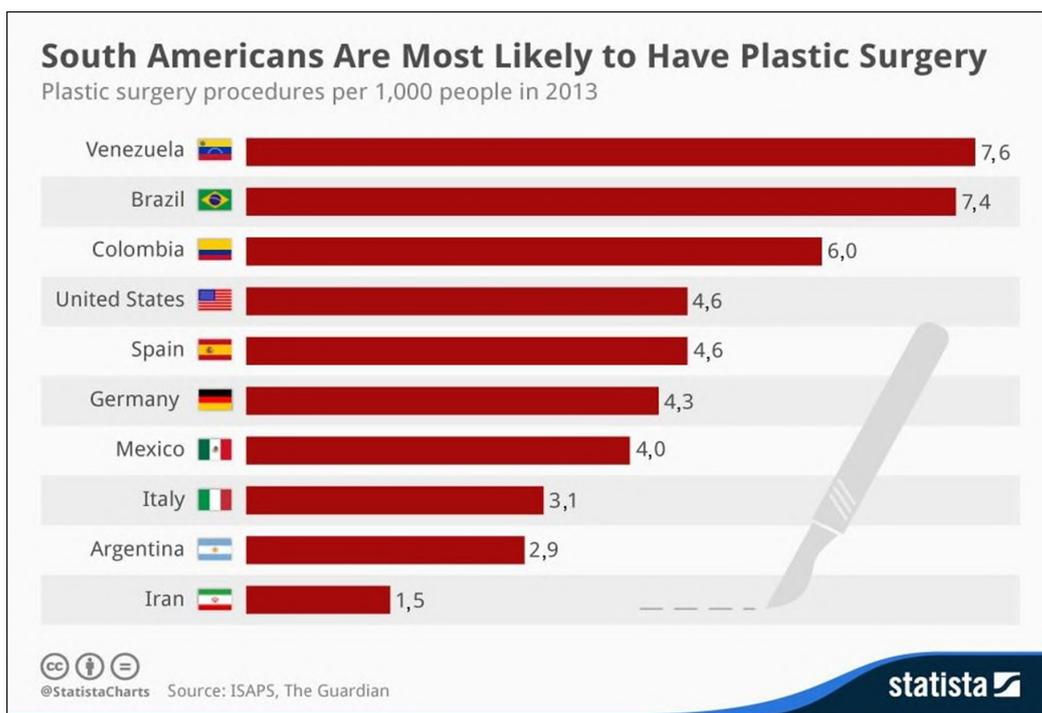
1.1 Plastic Surgery is a growing industry. A survey was conducted in South America in 2014 and the following information was reported in an article on statista.com:

**Note:** Eight out of every 1 000 Venezuelans had experienced some form of plastic surgery operation by 2013, propelling them to the top of the plastic surgery popularity league

1.1.1 Complete the following statement ... (2)  
One in every ... people have plastic surgery procedures in Venezuela.

1.1.2 If the number of Venezuelans having plastic surgery increased by 38% in 2014, determine the number of Venezuelans per 1 000 who experienced plastic surgery in 2014. (2)

1.2 The graph below shows the plastic surgery procedures per 1 000 people in 2013.



1.2.1 a State the number of plastic surgery procedures per 1 000 people conducted in Iran. (2)

b How many more per 1 000 people had plastic surgery in Italy as compared to Argentina? (2)

1.2.2 a Give the maximum number of plastic surgeries per 1 000 people that were conducted. (2)

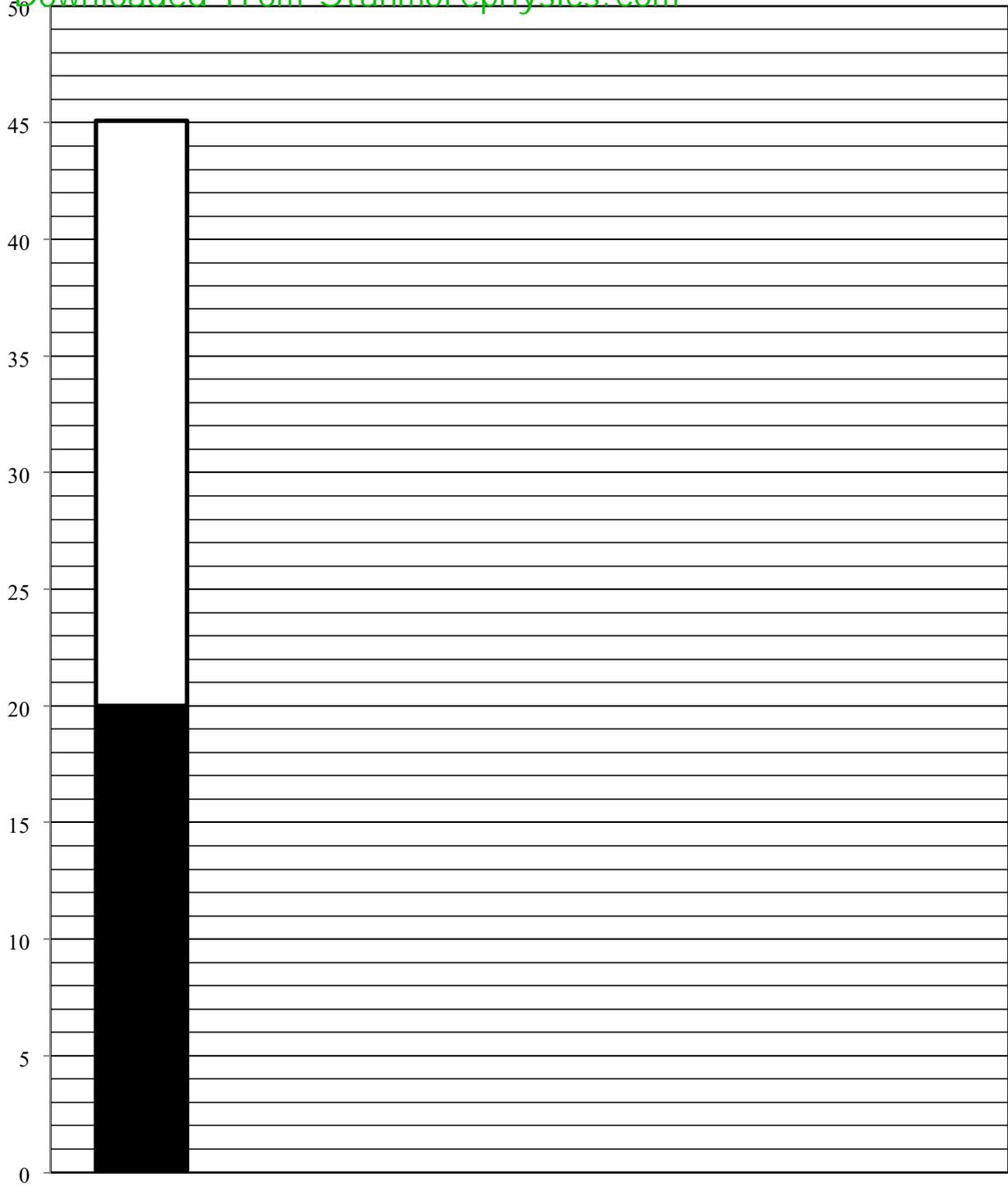
- b If there were 2 500 people surveyed in Mexico, how many of those people, according to the data, had plastic surgery? (2)
- 1.2.3 Determine from the graph the mean average plastic surgery procedures conducted per 1 000 people. (4)
- 1.2.4 a State the type of graph depicted in question 1.2 (2)
- b Explain the difference between continuous and discrete data. (2)
- c State whether the data shown in the graph is discrete or continuous. (2)
- 1.2.5 The probability of men having plastic surgery is  $\frac{1}{9}$  and the probability of the procedure done (skin and hair procedure) is  $\frac{14}{25}$ . (3)
- Determine the probability that a person randomly chosen from a list of people, is a male that had a skin and hair procedure done.

## ACTIVITY 2

Jenny is doing a school project on the different eye colours of learners in her class. She organises her data in the table below:

EYE COLOUR	Black	Brown	Blue	Green	Grey	Total
Female	(a)	30	10	15	10	(c)
Male	25	15	(b)	20	10	82
Total	45	45	22	35	20	(d)

- 2.1 Determine the missing values **(a)**, **(b)**, **(c)** and **(d)** in the table above (4)
- 2.2 State the probability that if a student from her grade randomly sat next to her, the student would be a male with green eyes. (2)
- 2.3 State the probability that a female chosen at random in her class would have blue eyes. (2)
- 2.4 If the probability of choosing a female with blue eyes at random is  $\frac{25}{82}$  what would it be stating in terms of gender and eye colour? (2)
- 2.5 What percentage of the students involved in this survey had either green or grey eyes? (3)
- 2.6 Draw a stacked bar graph to illustrate the information given in the table. Use the axes given below. The first bar has been drawn for you. (8)



**QUESTION 5 MJ 17**

5.1 A survey published by the Department of Education reported on the number of schools, learners and teachers in ordinary public schools and independent schools during 2013.

TABLE 3 in ANNEXURE D shows the number of learners, teachers and schools in South Africa.

**NOTE:** Some data have been omitted.

Use TABLE 3 to answer the questions that follow.

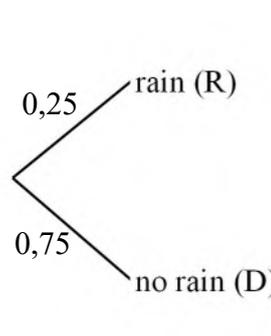
- 5.1.1 Which province had the second lowest number of learners? (2)
- 5.1.2 Determine the total number of teachers in South Africa for 2013. (3)
- 5.1.3 Calculate the percentage of schools found in KwaZulu-Natal. (3)
- 5.1.4 Use the formula below and determine the LSR for Gauteng.

$$\text{Learner-School Ratio} = \frac{\text{Total number of learners}}{\text{Total number of schools}} \quad (3)$$

- 5.1.5 Use the provincial LTR to answer the following.
  - (a) Write down the modal ratio. (2)
  - (b) Arrange the ratios in descending order. (2)
  - (c) Determine the median ratio. (2)
- 5.1.6 Use the TSR to complete the bar graphs on the attached ANSWER SHEET. (6)

5.2 A school kept records of all the learners that arrived late for school. The Mathematical Literacy teacher noticed that the late arrival is influenced by the occurrence of rain.

The tree diagram below was drawn to show the outcomes and probability of late arrivals when the chance for rain is 25%.



0,2	late (L)	.....	R , L	0,05
0,8	not late (N)	.....	<b>(a)</b>	0,2
0,1	late (L)	.....	<b>(b)</b>	0,075
0,9	not late (N)	.....	D , N	0,675

Study the tree diagram and answer the questions that follow.

- 5.2.1 Write down the percentage of learners who arrives late if it does not rain. (2)
- 5.2.2 Write down the missing outcomes **(a)** and **(b)**. (4)
- 5.2.3 Write down the probability (as a simplified common fraction) of randomly selecting a learner who arrived late for school on a rainy day. (2)
- 5.2.4 If the school has 1 562 learners, determine how many learners will not be late if the chance for rain is 25%. (3)
- [34]**

### QUESTION 5 ND 17

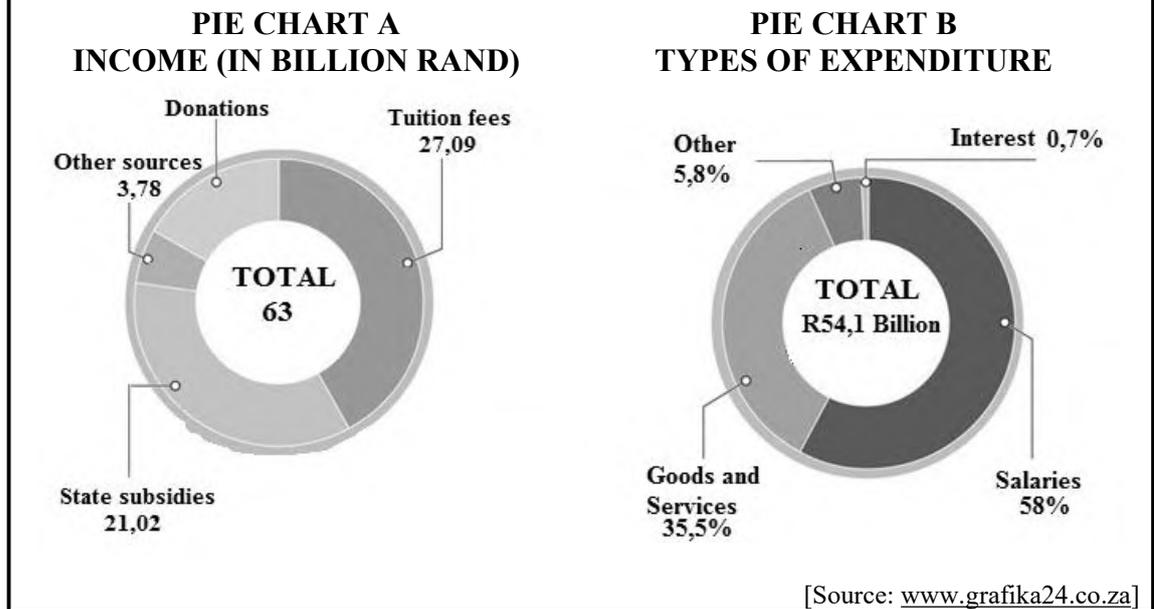
- 5.1 ANNEXURE C shows data relating to the 2015/2016 admissions for full-time NSC candidates for the 11 most common subjects.
- All full-time candidates have to take at least seven subjects. Mathematics or Mathematical Literacy is compulsory.

Study the information in ANNEXURE C to answer the questions that follow.

- 5.1.1 Name another type of graphical representation that could be used to represent this data. (2)
- 5.1.2 Determine the maximum number of candidates who were admitted as full-time candidates in 2016. (2)
- 5.1.3 Determine the probability of randomly selecting a candidate, taking Mathematics or Mathematical Literacy, who was admitted in 2015. (2)
- 5.1.4 List ALL the subjects that showed a decrease in the number of full-time candidates admitted from 2015 to 2016. (3)
- 5.1.5 Name the subject that showed the greatest increase in the number of candidates admitted in 2016. (2)
- 5.1.6 Explain why this is called *categorical data*. (2)
- 5.1.7 Identify which subject in 2016 had more than two hundred twenty three thousand, but less than two hundred seventy four thousand candidates. (2)

5.2

The two pie charts, **A** and **B**, below represent the income and expenditure of all South African tertiary institutions.



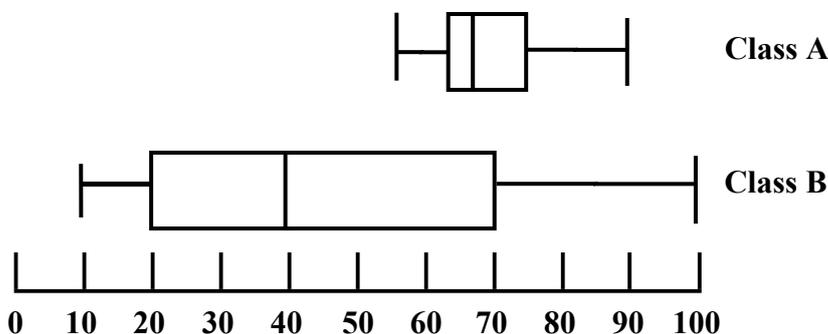
- 5.2.1 Give ONE example of an 'Other' type of expenditure applicable to tertiary institutions. (2)
- 5.2.2 What percentage of income comes from donations? (3)
- 5.2.3 Calculate the amount (in rand) of interest paid by tertiary institutions. (3)
- 5.2.4 Determine the difference (in millions of rand) between the income and expenditure of the tertiary institutions. (3)

[26]

**QUESTION 5 FM 18**

5.1

The two box-and-whisker plots below represent the percentage marks achieved by two Grade 12 classes. Each class consists of 26 learners.



The percentage marks for **Class A**, arranged in order, are given below:

<b>F</b>	58	60	62	62	63	65	65	66
	66	66	67	69	70	71	73	73
	75	75	<b>H</b>	80	83	85	90	

[SASAMS database]

**NOTE:**

- **F** is the lowest percentage mark
- **H** is a percentage mark between 75 and 80

- 5.1.1 Which ONE of the following terms best describes the data above:
- Categorical
  - Numerical
  - Qualitative
- (2)
- 5.1.2 Determine the percentage of data values that lies between the upper and lower quartiles.
- (2)
- 5.1.3 The range of Class A is 34.
- Calculate the value of **F**.
- (3)
- 5.1.4 Calculate the median percentage mark for Class A.
- (2)
- 5.1.5 Determine the inter quartile range for Class B.
- (3)
- 5.1.6 Give the modal percentage mark for Class A.
- (2)
- 5.1.7 Calculate the missing value **H** if the mean percentage mark for Class A is 70%.
- (3)
- 5.1.8 Determine (as a simplified common fraction) the probability of randomly selecting a learner from Class A who obtained a percentage mark different from any other learner in the class.
- (3)

5.2 A survey on the distribution of literacy levels among adults aged 35 to 64 was conducted in all provinces in South Africa.

TABLE 5 below shows the 2016 adult (aged 35 to 64) literacy levels per province.

**TABLE 5: 2016 ADULT (AGED 35 TO 64) LITERACY LEVELS PER PROVINCE**

PROVINCE	LITERACY LEVELS				TOTAL
	NON-LITERATE		LITERATE		
	Number	%	Number	%	
Western Cape	288 918	14,1	1 762 494	85,9	<b>2 051 412</b>
Eastern Cape	393 954	26,0	1 120 567	74,0	<b>1 514 521</b>
Northern Cape	94 552	27,9	244 282	72,1	<b>338 834</b>
Free State	192 933	24,1	609 029	75,9	<b>801 962</b>
KwaZulu-Natal	650 033	24,9	1 956 497	75,1	<b>2 606 530</b>
North West	299 994	28,3	760 068	71,7	<b>1 060 062</b>
Gauteng	575 371	12,5	4 013 463	87,5	<b>4 588 834</b>
Mpumalanga	312 273	28,5	784 347	71,5	<b>1 096 620</b>
Limpopo	372 090	28,7	922 171	71,3	<b>1 294 261</b>
<b>TOTAL</b>	<b>Q</b>		<b>12 172 918</b>		<b>15 353 036</b>

[Adapted from Community Survey, 2016]

**NOTE:** Some data has been omitted.

Use TABLE 5 above to answer the questions that follow.

5.2.1 Calculate the missing value **Q**. (2)

5.2.2 Determine the percentage of literate adults in South Africa. (3)

5.2.3 Express (as a unit ratio) the number of non-literate adults to the number of literate adults in KwaZulu-Natal. (3)

5.2.4 Arrange the number of literate adults per province in ascending order. (2)

5.2.5 Determine the province with the smallest difference between the number of literate and the number of non-literate adults. (2)

[32]

## QUESTION 5 MJ 18

5.1

Statistics South Africa (STATSSA) collects and releases data based on passenger transport annually. TABLE 2 below shows the 2016 data for land passenger transportation.

**TABLE 2: 2016 DATA FOR LAND PASSENGER TRANSPORT**

	LAND TRANSPORT				TOTAL LAND	
	RAIL		ROAD		Passenger journeys in thousands	Income in millions (R)
	Passenger journeys in thousands	Income in millions (R)	Passenger journeys in thousands	Income in millions (R)		
<b>JAN.</b>	30 526	238	24 279	748	54 805	986
<b>FEB.</b>	36 528	266	27 684	757	64 212	1 023
<b>MAR.</b>	34 250	254	30 277	869	64 527	1 123
<b>APR.</b>	32 940	238	24 268	743	57 208	981
<b>MAY</b>	32 372	233	25 940	770	58 312	1 003
<b>JUN.</b>	32 741	216	25 308	790	58 049	1 006
<b>JUL.</b>	31 792	247	23 609	768	55 401	1 015
<b>AUG.</b>	33 550	251	24 835	769	58 385	1 020
<b>SEP.</b>	38 024	275	27 144	836	65 168	1 111
<b>OCT.</b>	35 802	269	24 304	771	60 106	1 040
<b>NOV.</b>	34 700	254	25 225	782	59 925	1 036
<b>DEC.</b>	23 592	198	22 313	801	45 905	999
<b>TOTAL</b>	<b>396 817</b>	<b>...</b>	<b>305 186</b>	<b>9 404</b>	<b>702 003</b>	<b>12 343</b>

[Adapted from www.statssa.co.za]

Use the table above to answer the questions that follow.

- 5.1.1 Write down the month with the highest income for rail transportation. (2)
- 5.1.2 Calculate the mean monthly income for rail transportation. (3)
- 5.1.3 Calculate the road transportation income for April as a percentage of the total land income. (3)
- 5.1.4 Write down the total number of land passenger journeys for December. (2)
- 5.1.5 Write down (in words) the total number of passenger journeys for September. (2)
- 5.1.6 Calculate the median total land income. (3)
- 5.1.7 Write down the probability, as a decimal, of randomly selecting a month when the rail income for passenger transport was less than R200 000 000. (3)
- 5.1.8 A bar graph showing the monthly income for road transport for the last six months of the year, is drawn on ANSWER SHEET 1. On the same set of axes, draw another bar graph representing the monthly income for rail transport for the last six months of the year. (6)

5.2 The pie charts on ANNEXURE C show the different sources of income for households in the Western Cape and the Northern Cape in 2016.

Use ANNEXURE C to answer the questions that follow.

- 5.2.1 If the total number of households in the Western Cape was 2 768 000 during 2016, calculate the number of households that depend on grants as a source of income. (3)
- 5.2.2 Identify the THIRD HIGHEST source of income in the Western Cape. (2)
- 5.2.3 Calculate the difference between the number of households in the Western Cape and the Northern Cape that depended on business as a source of income for 2016. (3)
- 5.2.4 Determine the percentage (to TWO decimal places) of remittances in the Northern Cape if there were 532 000 households. (3)

[35]

**QUESTION 5 ND 18**

5.1 During certain seasons in South Africa, the wind can lead to fires that cause large damages. The fire losses in South Africa for the period 2010 to 2015 are shown in TABLE 4 below.

**TABLE 4: LOSSES CAUSED BY FIRE FOR THE PERIOD 2010 TO 2015**

	2010	2011	2012	2013	2014	2015
Total loss in rand (in millions)	1 323	2 085,6	3 162	2 158	1 847	2 732
GNI (in thousand millions)	2 608,5	2 897,6	3 066	3 441	3 694	3 913
Fire loss as a % of GNI	0,05%	0,07%	0,103%	<b>A</b>	0,05%	0,07%
Number of fires (in thousands)	26,5	37,7	41,4	42,3	46,1	45,7
Population (rounded) (in million)	49,9	51,7	52,2	52,9	53,5	54,3

[Adapted from: <http://www.fpsa.co.za>]

**NOTE:** GNI – gross national income

Study TABLE 4 above to answer the questions that follow.

- 5.1.1 Write down the total loss, in rand, caused by fire during 2011. (2)
- 5.1.2 Calculate the mean total loss, in rand, caused by fires for the period 2010 to 2015. (3)
- 5.1.3 Identify the maximum number of fires for the period 2010 to 2015. (2)
- 5.1.4 Calculate the value of **A**, the fire loss as a percentage of the GNI for 2013. Round your answer to TWO decimal places. (4)

5.2

TABLE 5 below shows the labour force characteristics of South Africa for the fourth quarter of 2017.

**TABLE 5: LABOUR FORCE CHARACTERISTICS IN SOUTH AFRICA IN 2017 (IN THOUSANDS)**

	TOTAL LABOUR FORCE	TOTAL NEA	ECONOMICALLY ACTIVE		
			TOTAL	Employed	Unemployed
Eastern Cape	4 216	2 071	2 145	1 391	754
Free State	1 893	697	1 196	806	390
Gauteng	10 059	3 016	7 043	4 991	2 052
KwaZulu-Natal	6 948	3 638	3 310	2 513	797
Limpopo	3 704	1 941	1 763	1 417	346
Mpumalanga	2 878	1 130	1 748	X	506
Northern Cape	790	349	441	321	120
North West	2 534	1 221	1 313	999	314
Western Cape	4 507	1 412	3 095	2 492	603
<b>South Africa</b>	<b>37 529</b>	<b>15 475</b>	<b>22 054</b>	<b>16 172</b>	<b>5 882</b>

[Adapted from: [www.statssa.co.za](http://www.statssa.co.za)]

**NOTE:** NEA – not economically active

Use TABLE 5 above to answer the questions that follow.

- 5.2.1 Explain the meaning of the term *unemployed* within the context of the table above. (2)
- 5.2.2 Determine the value of X, the number of people employed in Mpumalanga. (2)
- 5.2.3 Name ONE data collection instrument that could be used to collect the data above. (2)
- 5.2.4 Calculate the percentage of people in the Western Cape who are NOT economically active (NEA). (3)
- 5.2.5 Write down the ratio of employed people to unemployed people in South Africa in the form ... : 1. (2)
- 5.2.6 Determine the probability (as a decimal) of randomly selecting a person in the Free State who is NOT economically active (NEA). (3)
- 5.2.7 The graph on the ANSWER SHEET represents the number of economically active people, as well as those who are not economically active (NEA) in South Africa. The bars for ALL economically active persons and only the bar for the people in the Eastern Cape who are NOT economically active (NEA) are drawn.
- Use the ANSWER SHEET to draw the graphs for the rest of the provinces. (6)
- 5.2.8 Determine the probability, as a simplified fraction, of selecting a province where fewer than 350 000 people are unemployed. (4)

[35]

## QUESTION 5 MJ 19

5.1

TABLE 4 shows the types of voting stations (VSs) used during the 2016 local government elections in South Africa.

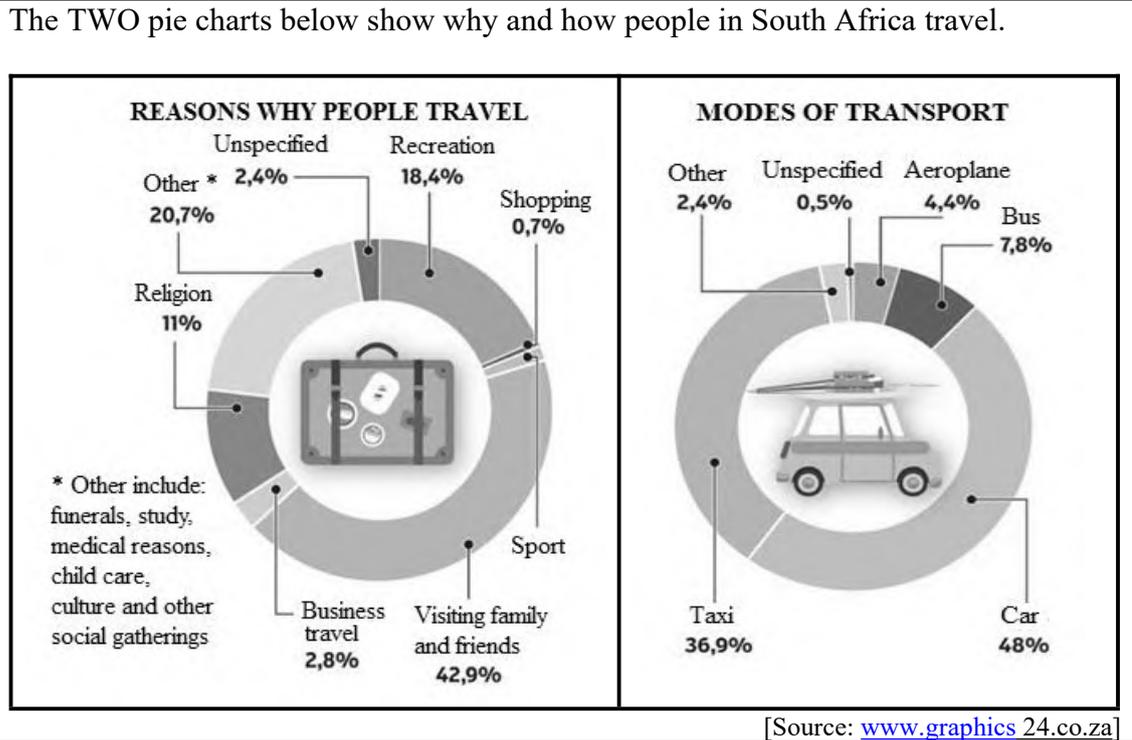
**TABLE 4: TYPES OF VOTING STATIONS**

PROVINCE	VSs	PERMANENT	TEMPORARY	MOBILE
Eastern Cape	<b>4 699</b>	4 535	161	3
Free State	<b>1 531</b>	1 342	189	0
Gauteng	<b>2 716</b>	2 389	327	0
KwaZulu-Natal	<b>4 792</b>	4 647	133	12
Limpopo	<b>3 111</b>	2 966	<b>145</b>	0
Mpumalanga	<b>1 744</b>	1 650	82	12
North West	<b>1 723</b>	1 605	115	3
Northern Cape	<b>710</b>	684	26	0
Western Cape	<b>1 586</b>	1 534	50	2
<b>TOTAL</b>	22 612	21 352	1 228	32

[Source: [www.elections.org.za](http://www.elections.org.za)]

- 5.1.1 Name a type of instrument used to collect this data. (2)
- 5.1.2 State the province which has the most voting stations. (2)
- 5.1.3 Determine the mean number of voting stations (VSs) in South Africa. (3)
- 5.1.4 Write down the modal number of mobile voting stations in South Africa. (2)
- 5.1.5 Determine the total number of temporary VSs as a percentage of the total number of VSs in South Africa. (3)
- 5.1.6 Determine the probability of randomly selecting a mobile VS in Gauteng. (2)
- 5.1.7 Show how the value of 145 was calculated. (2)
- 5.1.8 The bar graph on ANSWER SHEET 2 shows the total number of voting stations.
- On the same ANSWER SHEET, the first three bars are drawn showing the permanent voting stations.
- Fill in the remaining bar graphs showing the permanent voting stations. (6)

5.2

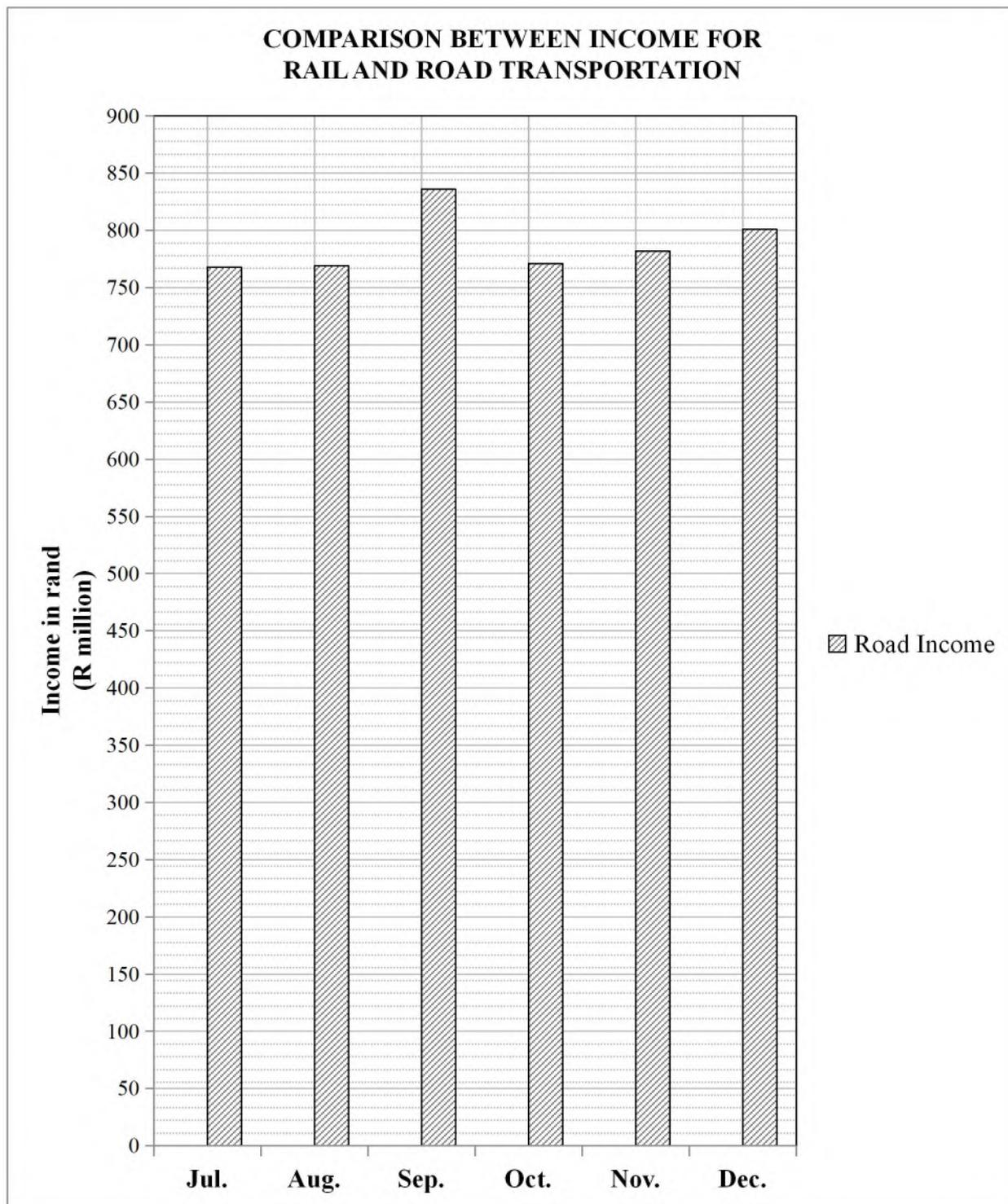


Study the TWO pie charts above and answer the questions that follow.

- 5.2.1 Calculate the percentage of people whose reason for travel is sport. (2)
- 5.2.2 Which mode of transport is used by most people? (2)
- 5.2.3 Determine the probability (written as a fraction in its simplest form) of randomly selecting a person whose mode of transportation is travelling by bus. (3)
- 5.2.4 A total of 542 267 people took part in this survey.  
Calculate the number of people who travel to visit family and friends. (2)

[31]

QUESTION 5.1.8



QUESTION 5.2.7

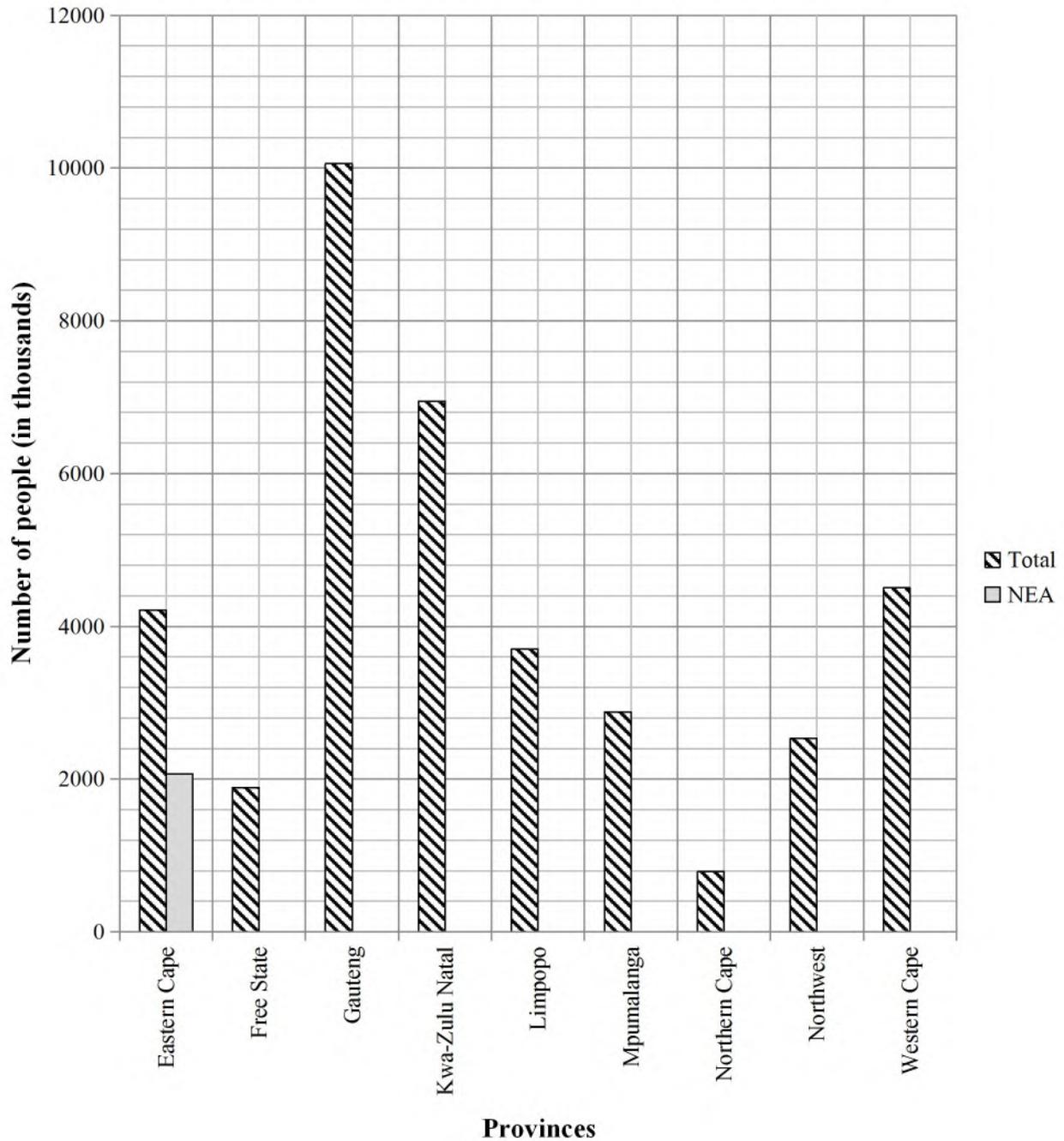
CENTRE NUMBER:

--	--	--	--	--	--	--	--

EXAMINATION NUMBER:

--	--	--	--	--	--	--	--	--	--	--	--	--

**NUMBER OF ECONOMICALLY ACTIVE AND NOT ECONOMICALLY ACTIVE PEOPLE IN SOUTH AFRICA**



**ANSWER SHEET 1**

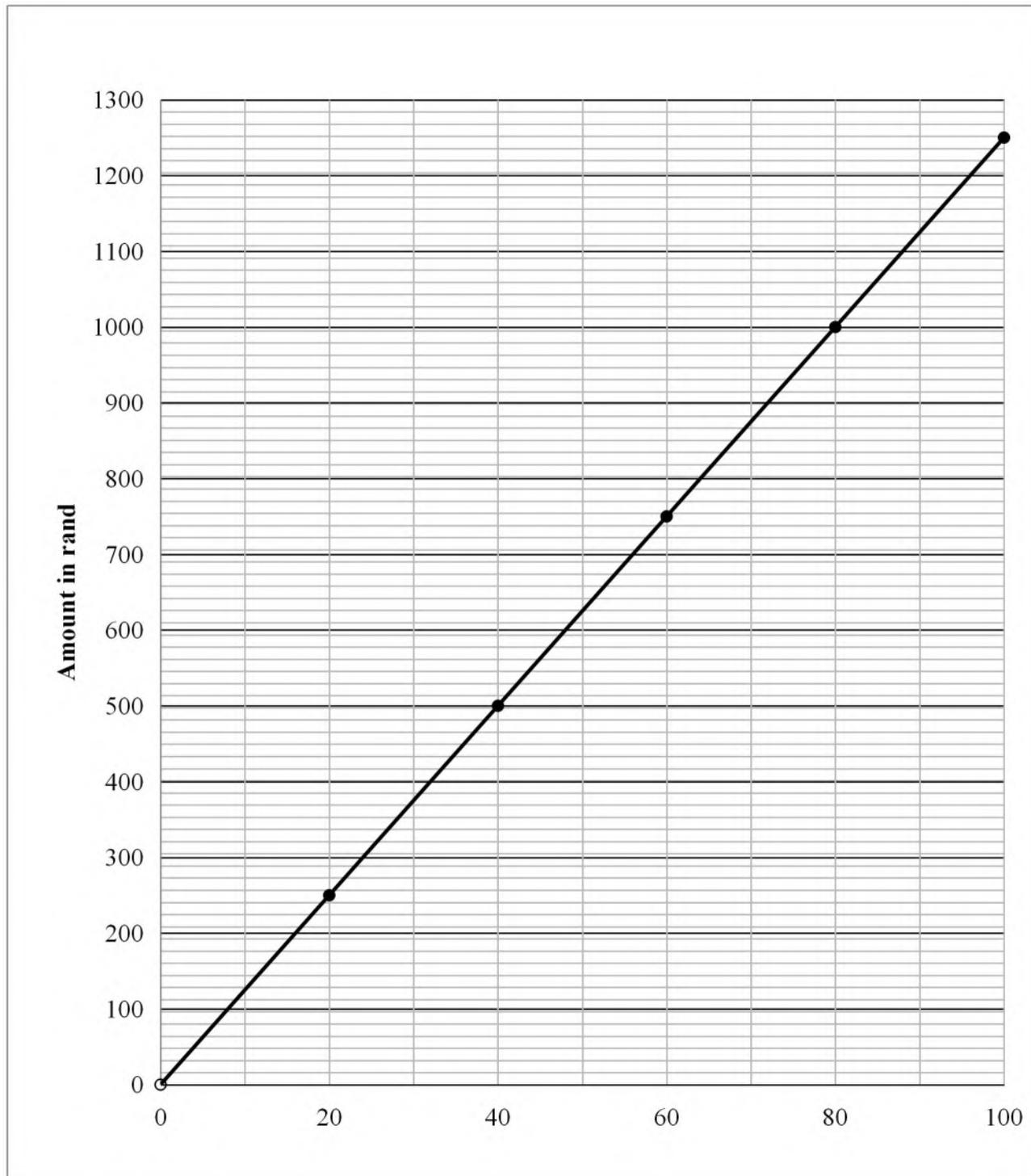
**QUESTION 2.2.3**

**CENTRE NUMBER:**

--	--	--	--	--	--	--	--

**EXAMINATION NUMBER:**

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



**ANSWER SHEET 2**

**QUESTION 5.1.8**

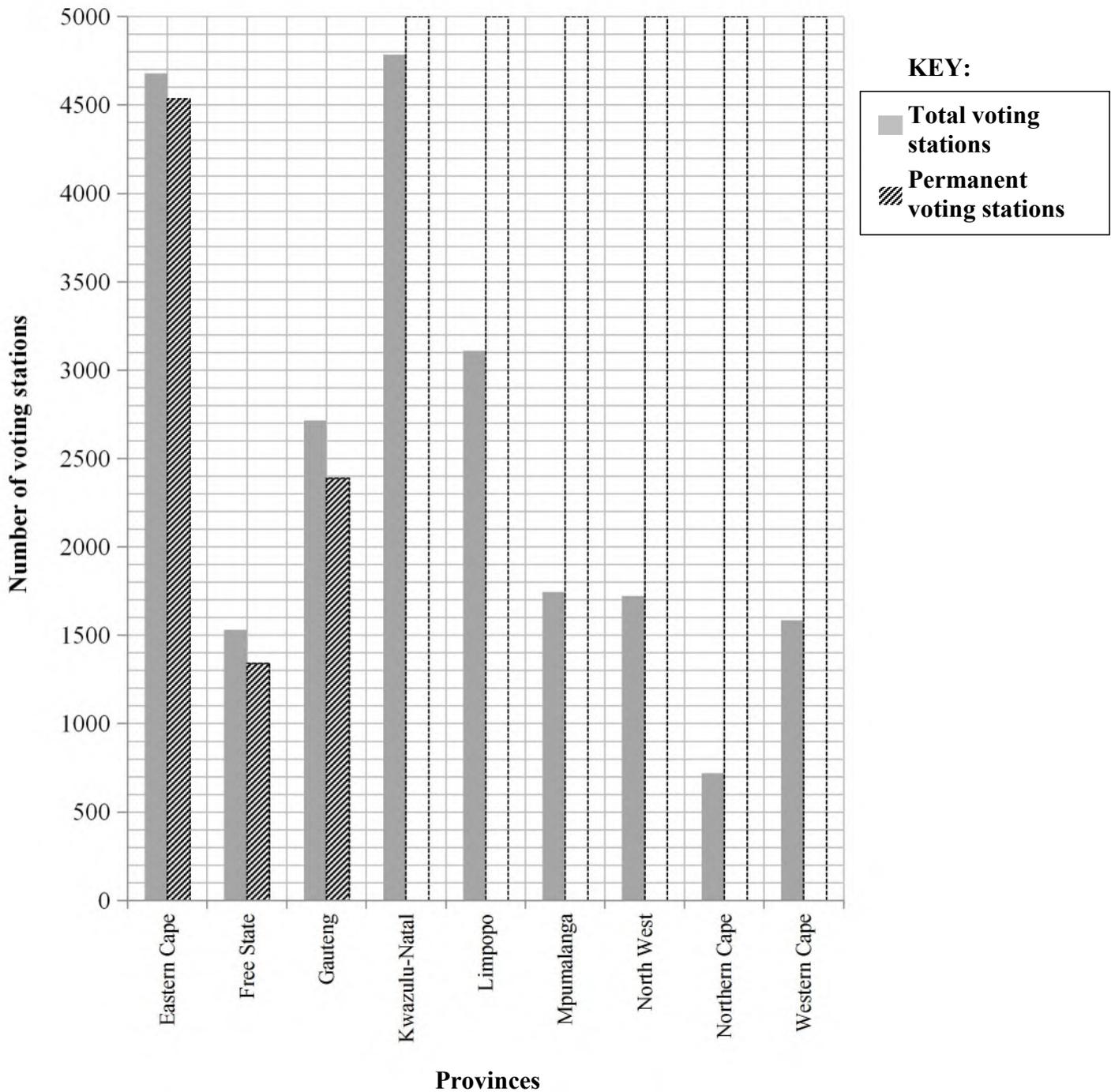
**CENTRE NUMBER:**

--	--	--	--	--	--	--	--

**EXAMINATION NUMBER:**

--	--	--	--	--	--	--	--	--	--	--	--	--

**Types of voting stations used during the 2016 local government elections**



# ADDENDUM

## ANNEXURE A MJ 17

## QUESTION 2.1

**Savings Account Statement**

CPT Bank Limited  
1 Quantum Street  
Techno Park  
Stellenbosch 7600

From Date: 22/10/2015  
To Date: 20/12/2015

**Personal Details**  
Mrs Amooth Siya  
37 Madiba Avenue  
Bloemfontein 9001

Account Number: 14326\*\*\*\*

Transaction Date	Description	Money In (R)	Money Out (R)	Balance (R)
23/10/2015	Mdlalose		600,00	8 060,27
23/10/2015	#Payment Fee		1,50	8 058,77
23/10/2015	Sandile		3 120,00	4 938,77
23/10/2015	#Payment Fee		1,50	4 937,27
23/10/2015	Annari		898,60	4 038,67
23/10/2015	#Payment Fee		1,50	4 037,17
23/10/2015	#SMS Notify Fee		0,40	4 036,77
23/10/2015	#SMS Notify Fee		0,40	4 036,37
23/10/2015	#SMS Notify Fee		0,40	4 035,97
23/10/2015	#SMS Update Fee		1,20	4 034,77
31/10/2015	Monthly Interest	---		4 050,98
31/10/2015	#Monthly Admin Fee		5,00	4 045,98
24/11/2015	Print Gift		3 625,00	420,98
24/11/2015	#Payment Fee		1,50	419,48
24/11/2015	#SMS Notify Fee		0,40	419,08
24/11/2015	#SMS Update Fee		0,40	418,68
27/11/2015	Transfer from 15100; Mdiso Khaile	230,00		648,68
27/11/2015	#SMS Update Fee		0,40	648,28
30/11/2015	Monthly Interest	12,08		660,36
30/11/2015	#Monthly Admin Fee		5,00	655,36

**End**

*Transactions not yet processed on your account up to 20/12/2015*

**There are no Unprocessed Transaction Items**

*Cheques not yet processed on your account up to 20/12/2015*

**There are no Unprocessed Cheque Items**

#14% VAT inclusive in the amount

## QUESTION 2.2

**TABLE 2: EXTRACT FROM THE MSUNDUZI CONSOLIDATED BUDGET.  
ALL AMOUNTS IN THOUSANDS OF RAND**

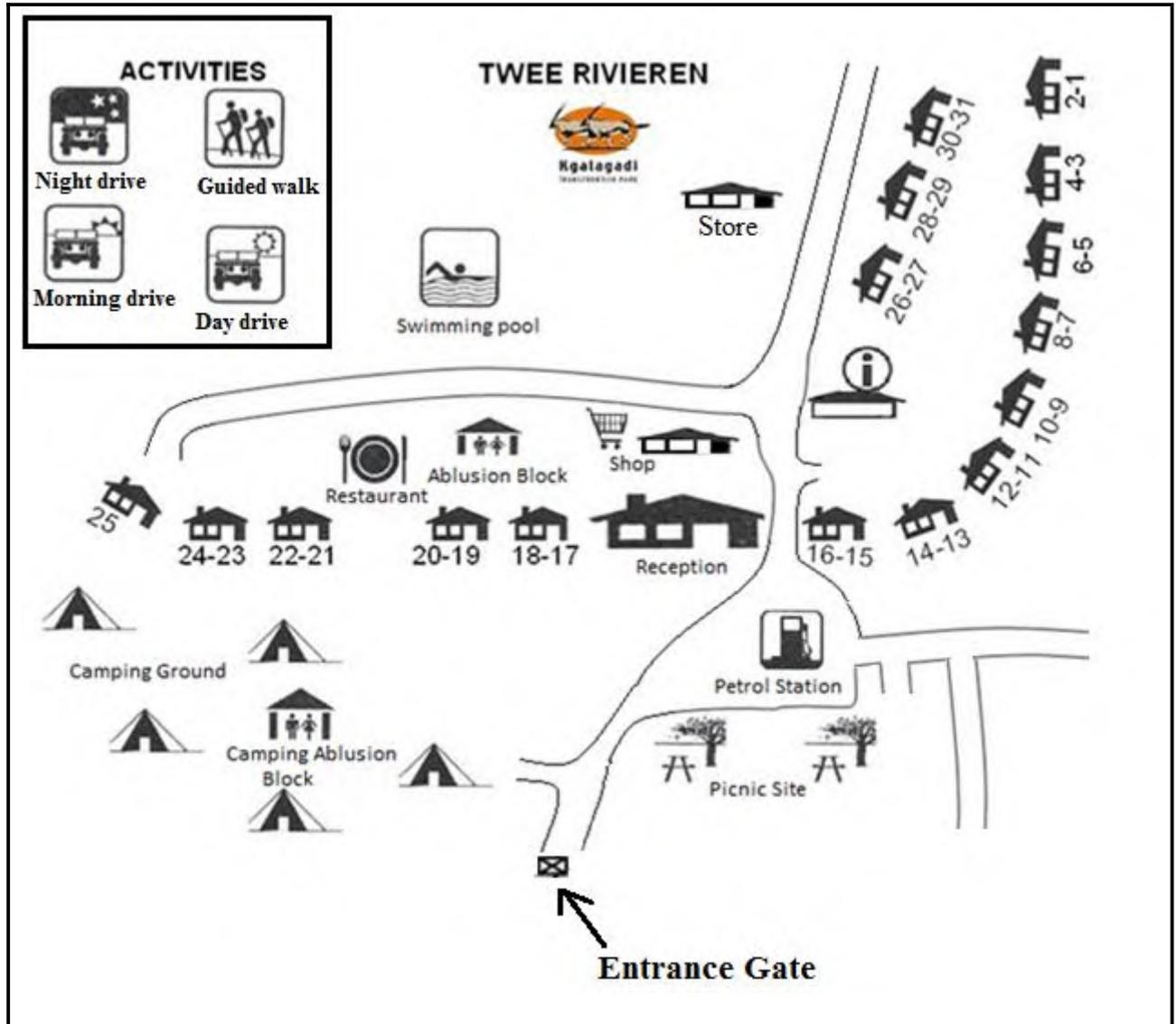
Description	2013/14	2014/15	Current Year 2015/16		2016/17 Medium-term Income and Expenditure Framework Plan	
	Audited	Audited	Original Budget	Pre-audit outcome	Budget Year 2016/17	Budget Year 2017/18
<b>Income</b>						
Property rates	625 627	716 603	784 462	794 866	842 558	893 111
Service charges	2 073 501	2 227 636	2 694 542	2 694 542	2 878 830	3 116 589
Investment income	43 343	51 027	34 044	34 044	49 330	52 243
Transfer cost	448 122	519 604	440 652	<b>B</b>	489 491	530 153
Other income	293 743	312 290	211 525	211 526	212 797	221 307
<b>Total Income</b>	<b>3 484 336</b>	<b>...</b>	<b>4 165 225</b>	<b>4 253 219</b>	<b>4 473 006</b>	<b>4 813 403</b>
<b>Expenditure</b>						
Employee costs	824 585	886 355	961 335	961 335	1 040 938	1 101 367
Remuneration of councillors	37 100	34 657	42 350	42 350	43 033	45 615
Depreciation and asset impairment	453 359	481 980	487 299	487 299	507 298	569 317
Finance charges	67 196	71 180	69 501	69 501	65 474	58 263
Materials and bulk purchases	1 592 462	1 780 120	1 967 839	1 982 214	2 118 107	2 311 745
Transfers and grants	218	238	128 362	128 362	140 526	153 542
Other expenditure	636 659	875 072	507 212	567 289	538 193	520 498
<b>Total Expenditure</b>	<b>3 611 579</b>	<b>...</b>	<b>4 163 898</b>	<b>4 238 350</b>	<b>4 453 569</b>	<b>4 760 347</b>
<b>Surplus/(Deficit)</b>	<b>(127 243)</b>	<b>A</b>	<b>1 327</b>	<b>14 870</b>	<b>19 436</b>	<b>53 055</b>

[Adapted from Msunduzi Budget for 2016/2017]

ANNEXURE C MJ 17

QUESTION 4.2

LAYOUT PLAN OF THE TWEE RIVIEREN CAMP



[Adapted from <https://www.sleeping-out.co.za/ftp/Maps>]

NOTE:



means cottage number 1 and cottage number 2 are located next to each other

## ANNEXURE D MJ 17

## QUESTION 5.1

**TABLE 3: NUMBER OF LEARNERS, TEACHERS AND SCHOOLS, AND LEARNER-TEACHER RATIO (LTR), LEARNER-SCHOOL RATIO (LSR) AND TEACHER-SCHOOL RATIO (TSR) IN PUBLIC SCHOOLS AND INDEPENDENT SCHOOLS, BY PROVINCE, DURING 2013**

PROVINCE	NUMBER OF LEARNERS	NUMBER OF TEACHERS	NUMBER OF SCHOOLS	RATIOS		
				LTR	LSR	TSR
Eastern Cape	1 938 078	66 007	5 733	29,4	338	11,5
Free State	664 508	24 475	1 396	27,2	476	17,5
Gauteng	2 129 526	74 823	2 649	28,5		28,2
KwaZulu-Natal	2 866 570	96 057	6 156	29,8	466	15,6
Limpopo	1 714 832	57 108	4 067	30,0	422	14,0
Mpumalanga	1 052 807	34 936	1 885	30,1	559	18,5
Northern Cape	282 631	8 972	573	31,5	493	15,7
North West	788 261	26 194	1 606	30,1	491	16,3
Western Cape	1 052 435	36 451	1 655	28,9	636	22,0
<b>Totals</b>	<b>12 489 648</b>		<b>25 720</b>	<b>29,4</b>	<b>486</b>	<b>16,5</b>

[Adapted from *Snap Survey 2013*]

ANNEXURE A ND 17

QUESTION 2.2

MUNICIPAL ACCOUNT STATEMENT

Fortune SJ 33 Wood Street Smelderado Estate 1811	<b>Date</b>	2017/01/02
	<b>Statement for</b>	January 2017

**Account Number 547 892 30495 8233**

Stand Size	Number of Dwellings	Valuation Date	Portion	Municipal Valuation	Region
463 m <sup>2</sup>	1	2013/07/01	C	Market value R690 000	Q

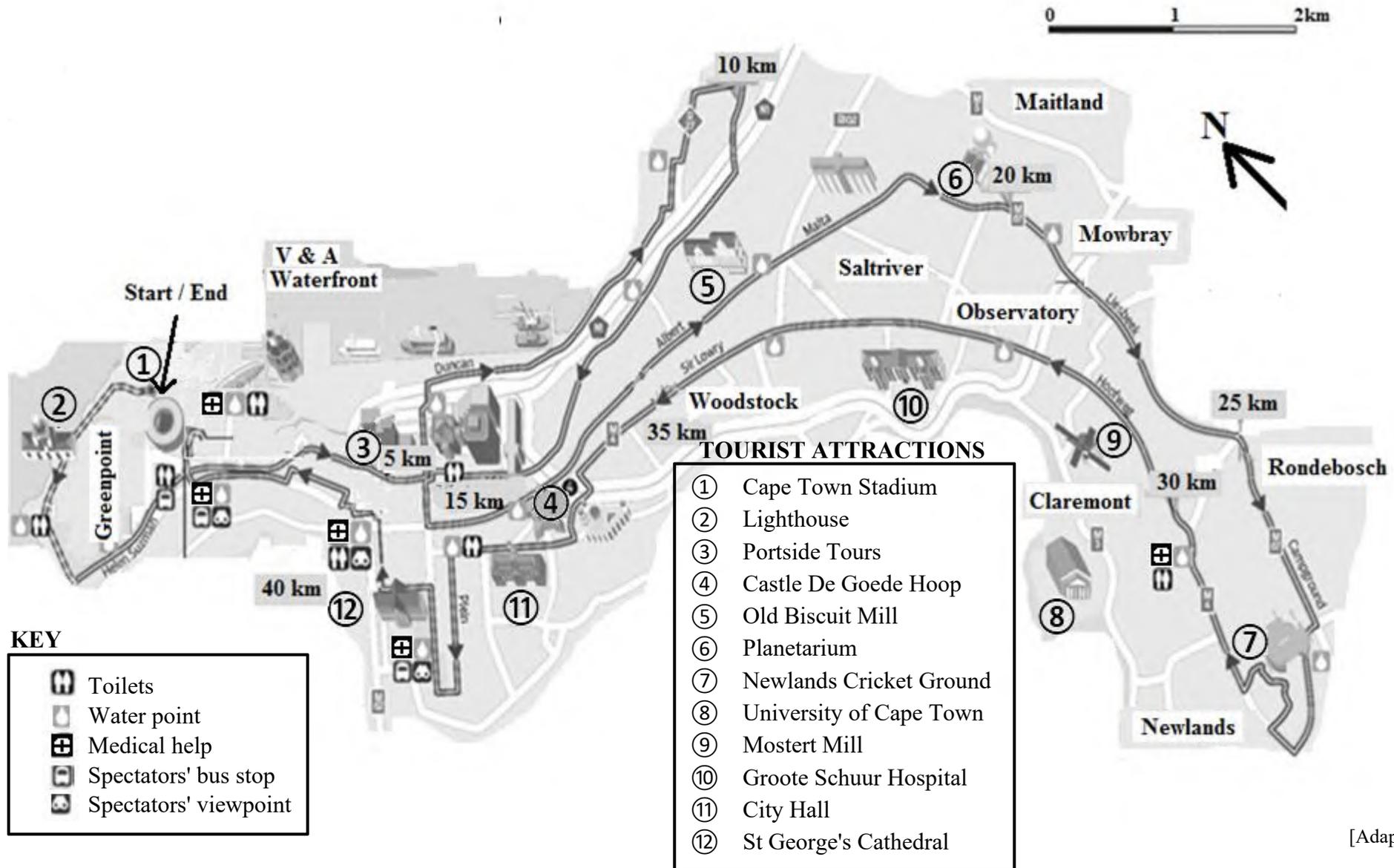
<b>Water and Sewerage</b>		
	<b>AMOUNT</b>	<b>SUBTOTAL</b>
Reading Period (23 days): 2016/11/27 to ...		
Meter readings and consumption: Start reading 467,00 and end reading 479,00 Consumption = 12,00 kℓ Daily average consumption 0,522 kℓ		
Charges for 12,00 kℓ are based on a sliding scale. Step 1 4,534 kℓ @ R0,000 Step 2 3,022 kℓ @ R7,140 Step 3 3,778 kℓ @ R12,070 Step 4 0,666 kℓ @ R17,650 Monthly sewerage charge based on stand size 463 m <sup>2</sup> (Billing period 2016/12) VAT: 14,00%	0,00 21,58 45,60 11,76 298,36 52,82	430,12
<b>Property Rates</b>		
Category of Property: Property Rates Residential Property rates are based on the market value of the property and are calculated as follows: $R690\,000,00 \times R0,006\,916\,0 \div 12$ Less rates on first R200 000,00 of market value VAT: 0%	A -115,27 0,00	B
<b>Refuse</b>		
Refuse Removal VAT: 14%	147,00 20,58	167,58
<b>Current Charges (Incl. VAT)</b>		<b>880,10</b>

<b>Previous Account Outstanding Balance</b>		919,33
Current Charges		880,10
	<b>Total Due</b>	<b>1 799,43</b>
	<b>Due Date</b>	<b>2017/01/25</b>

[Adapted from City of Johannesburg Municipal Account]

ANNEXURE B ND 17

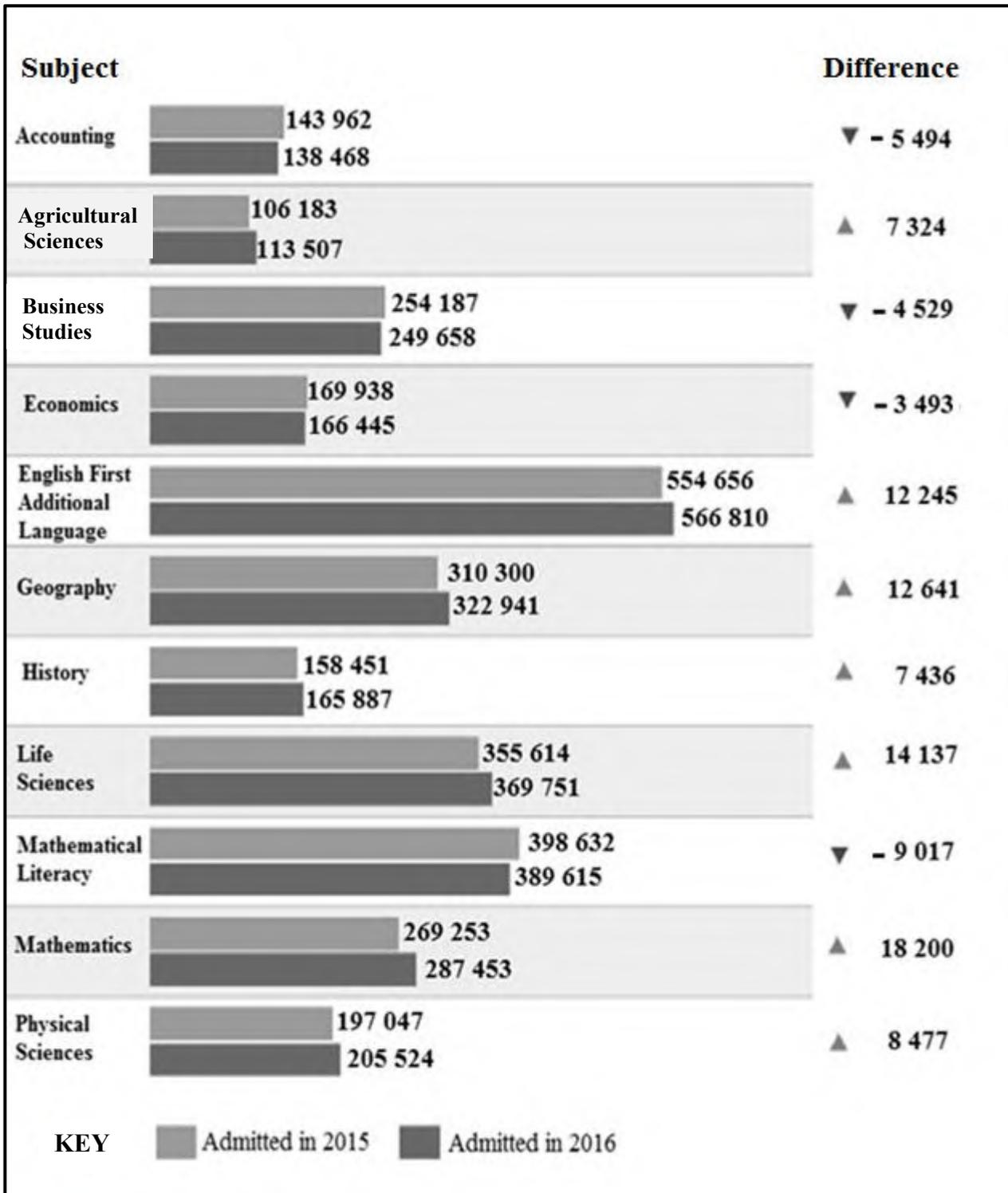
QUESTION 4.1 ROUTE MAP SHOWING SUBURBS AND TOURIST ATTRACTIONS FOR THE 42,2 km 2017 CAPE TOWN MARATHON



[Adapted from [www.g](http://www.g)

QUESTION 5

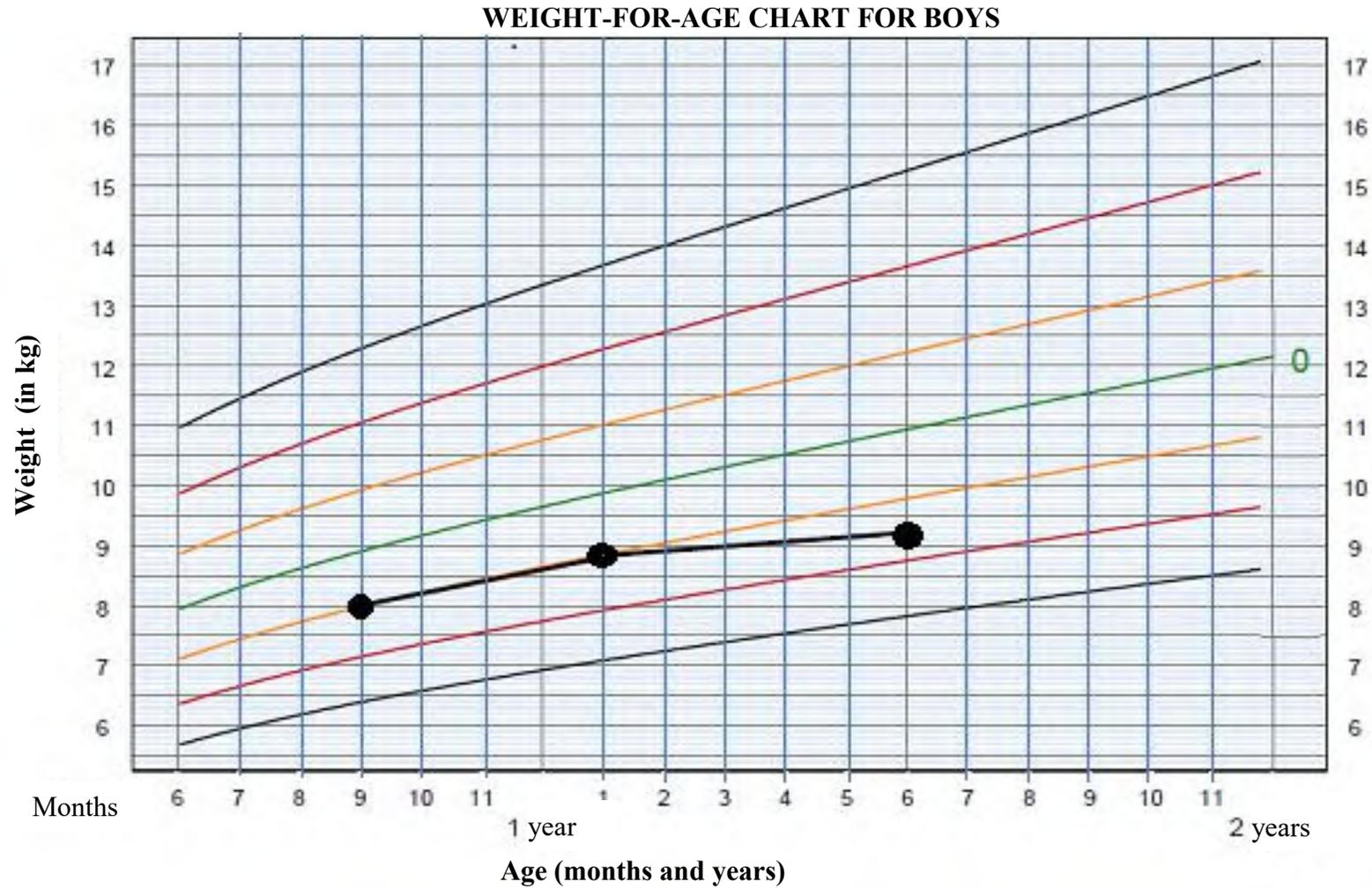
FULL-TIME NSC CANDIDATES' ADMISSION FOR THE 11 MOST COMMON SUBJECTS



[Source:

ANNEXURE A FM 18

QUESTION 3.1

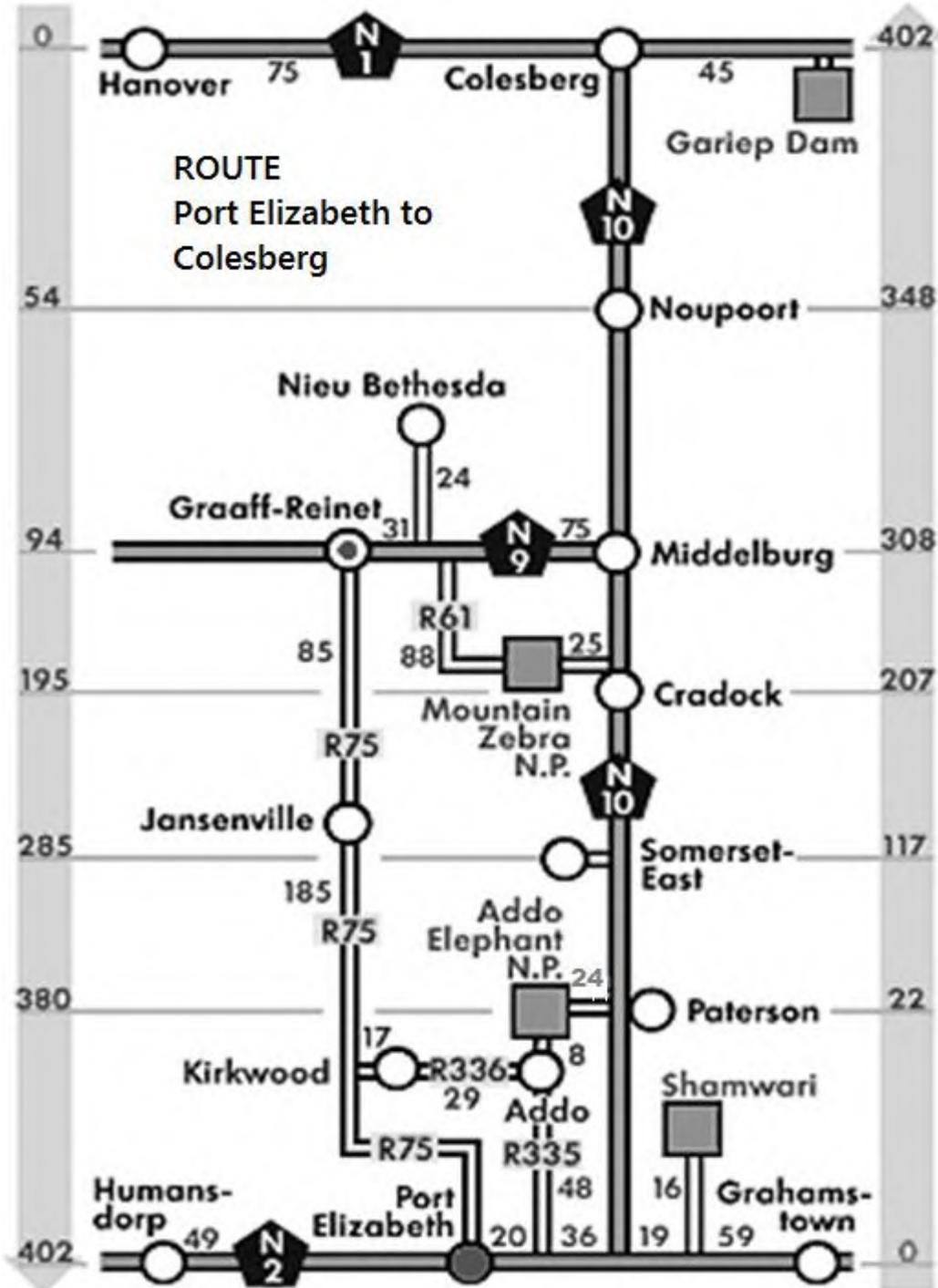


**NOTE:** The dots on the solid black line shows the three visits.

[Source: World Health Organisation (WHO)]

ANNEXURE B FM 18  
QUESTION 4.1

STRIP CHART OF THE ROUTE FROM COLESBURG TO PORT ELIZABETH (DISTANCES IN KILOMETRES)



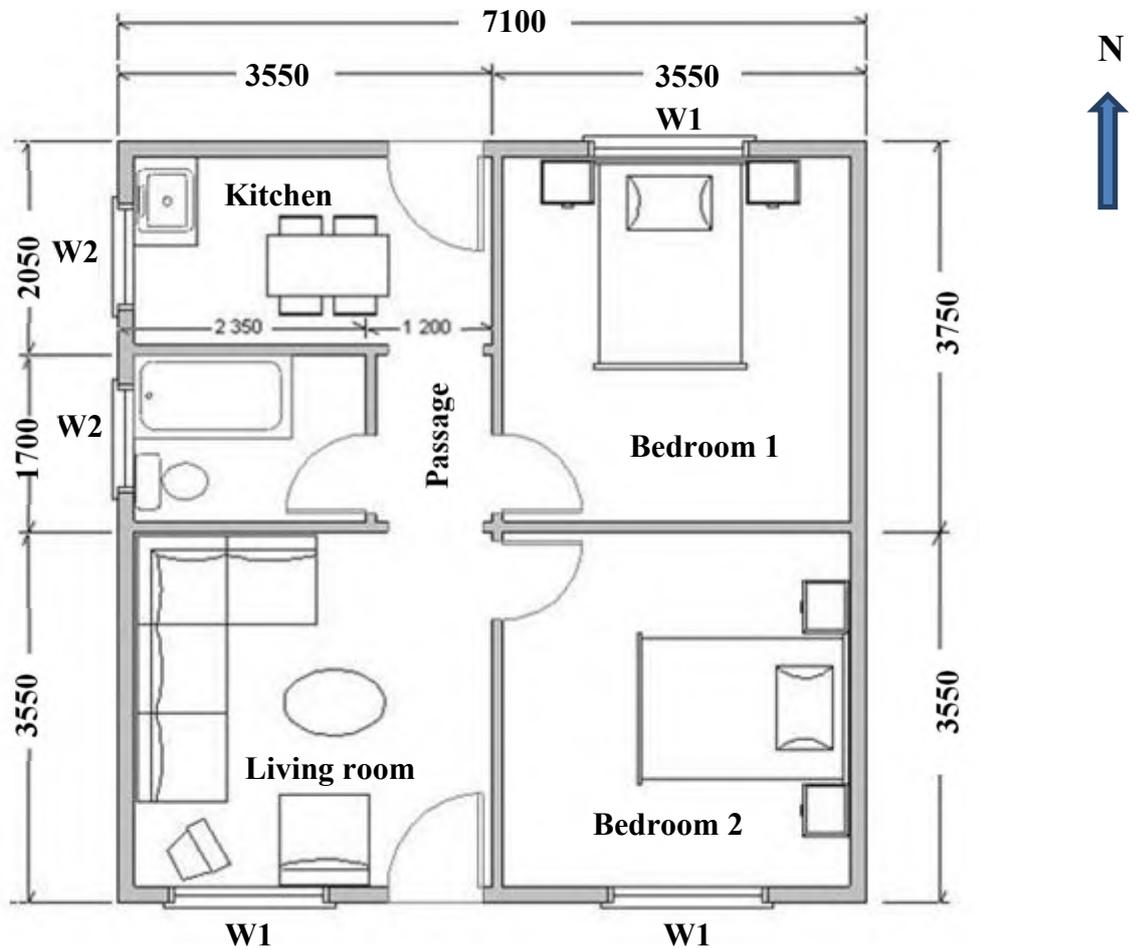
[Source: [www.google.com](http://www.google.com)]

KEY

	National road	N.P.	National Park
	Regional road		

QUESTION 4.2

FLOOR PLAN OF A HOUSE IN PORT ELIZABETH



[Source: <http://www.saplans.co.zap1003>]

**NOTE:** All measurements are in **millimetres**.

KEY:	ITEMS	DESCRIPTION
	W1 =	Window opening
	W2 =	Window opening
		Opening requiring solid door

ANNEXURE A MJ 18

QUESTION 2.1

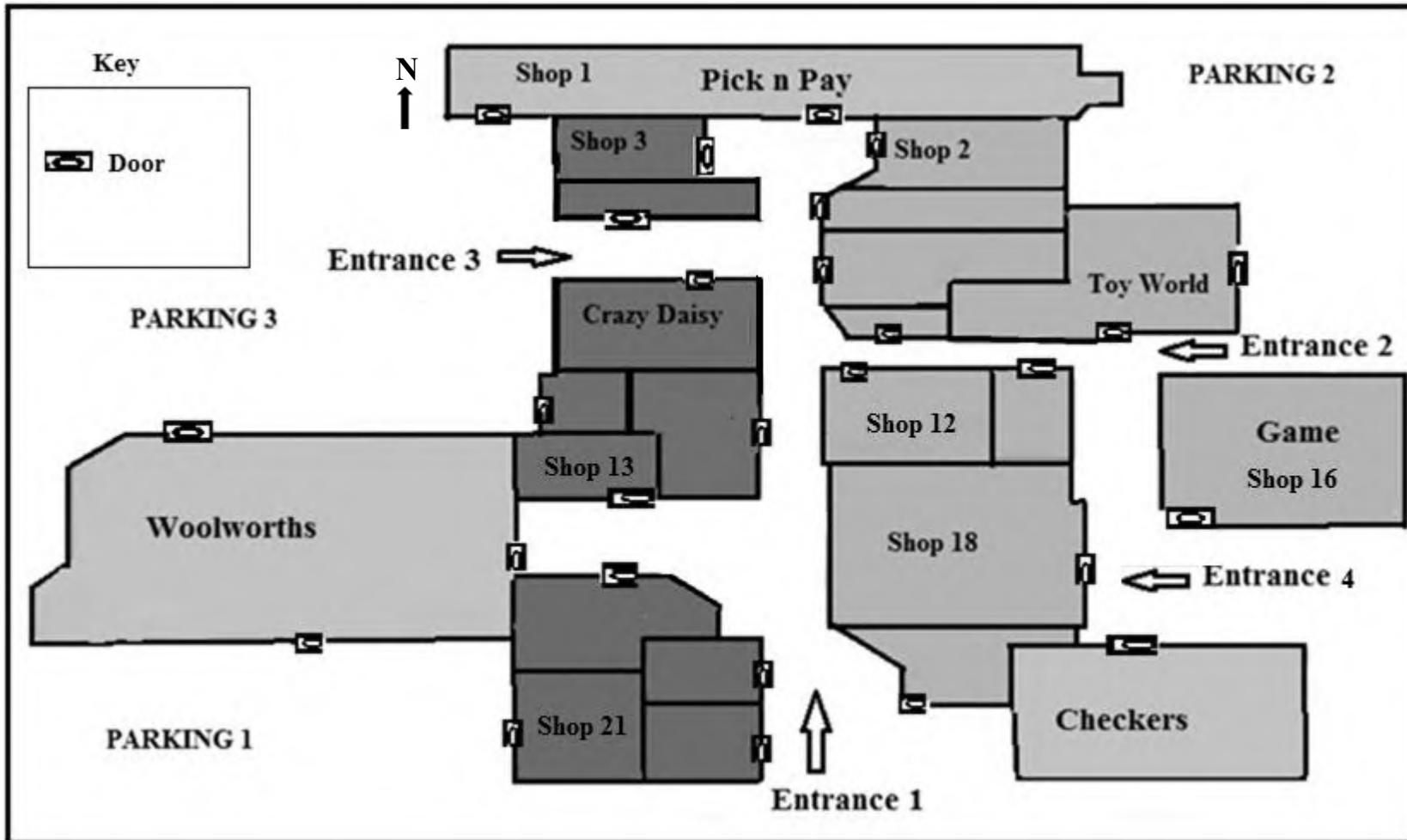
GEMS		MEMBER: 3526178 MRS CHAN			STATEMENT REFERENCE: A356748 DOCUMENT REFERENCE: 5109725				DATE 15/12/17 STATEMENT 187992			
Transaction information					Payment information							
Date treated	Patient	Tariff code	Amount claimed	Benefit approved	Scheme paid supplier	Scheme paid member	Member owes scheme	Member paid/owes supplier	See below	Amount paid in hospital benefit	Amount paid from other limits	Tax claimable amount
<b>DIS-CHEM PHARMACY 098 234 (Chemist)</b>									9505			
08/12/17	Lee	Acute	736,90									
08/12/17	Lee	Chronic	173,03	173,03	173,03						173,03	
08/12/17	Lee	Chronic	117,44	117,44	117,44						117,44	
08/12/17	Lee	Chronic	61,50	61,50	61,50						61,50	
08/12/17	Lee	Chronic	80,98	80,98	80,98						80,98	
08/12/17	Lee	Chronic	46,80	46,80	46,80						46,80	
<b>Dhlamini M DR 1627805 (General Practitioner)</b>												
08/12/17	Lee	0192	343,00					343,00	870			343,00
09/12/17	Lee	0132	102,10					102,10	870			102,10
<b>Totals:</b>			<b>1 661,75</b>	<b>479,75</b>				<b>445,10</b>				<b>445,10</b>

Summary of Financial Information	
Payable to Member (Credit)	0,00
Less owed to Scheme (Debit)	0,00
Member to pay Supplier(s) (Debit)	445,10
Tax claimable to date	5 326,66

Summary of codes	
870	Overall Limit Exceeded
9505	Pre authorisation required

ANNEXURE B MJ 18  
QUESTION 4.1

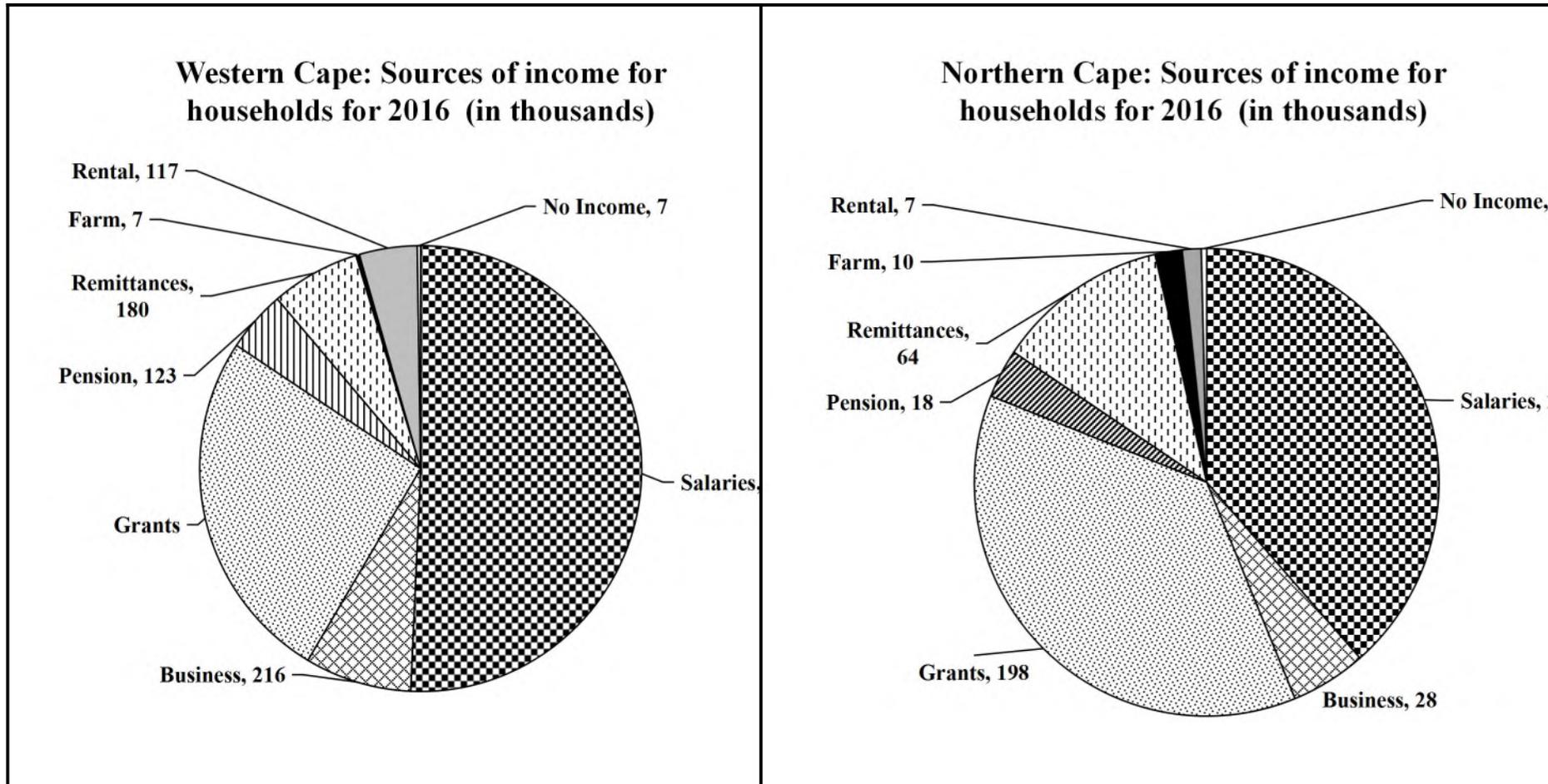
LAYOUT PLAN OF THE SHOPPING MALL



[Adapted from [www.thenewoakparkmall.com](http://www.thenewoakparkmall.com)]

ANNEXURE C MJ 18

QUESTION 5.2 PIE CHARTS SHOWING THE DIFFERENT SOURCES OF INCOME FOR TWO PROVINCES



[Adapted from [www.statssa.co.za](http://www.statssa.co.za)]

QUESTION 2.1

STUDENT FEES STATEMENT FOR TAMRYN ABRAHAMS FOR SEPTEMBER 2017

	<b>UNIVERSITY OF CAPE TOWN</b>	
	FEES OFFICE UCT PRIVATE BAG X3 RONDEBOSCH 7701	+27 21 650-1704 +27 21 650-4768 Email: <a href="mailto:fnf-feeeng@uct.ac.za">fnf-feeeng@uct.ac.za</a> Web: <a href="http://www.uct.ac.za">http://www.uct.ac.za</a>
STUDENT FEES STATEMENT		Page 1 of 1

Miss Tamryn Abrahams 24 Hoop Street Extension 12 Upington 8801	Statement of account as on	06/10/17
	e-mail address	<a href="mailto:John.Abrms@gmail.com">John.Abrms@gmail.com</a>
	Invoice ID	UCT STAT NO. 0003399891
	Student name	Tamryn Jessica Abrahams
	Student number	ABRTAM002
	Account number	1567858
Anticipated funding	R0,00	

Date	Details*	Debit	Credit	Balance
	Balance brought forward	14 819,50		14 819,50
31/12/16	Interest on overdue fees	148,20		14 967,70
16/01/17	No. 5 Bank Acc direct deposit Ref 950230173		-8 650,00	<b>6 317,70</b>
06/03/17	APG 2000F History & Theory of Arch	3 030,00		
06/03/17	APG 2000F History & Theory of Arch	3 030,00		
06/03/17	APG 2003S Theory Structures 3	2 280,00		
06/03/17	APG 2009F Theory Structures 4	2 280,00		
06/03/17	APG 2011S Technology 2	9 580,00		
06/03/17	APG 2038W Environ & Services II	4 530,00		
06/03/17	APG 2039W Design & Theory Studio II	29 460,00		
23/03/17	Late payment penalty	2 087,00		62 594,70
16/05/17	No. 5 Bank Acc direct deposit Ref 950241526		-23 000,00	39 594,70
31/08/17	Interest on overdue fees	395,95		
30/09/17	Interest on overdue fees	395,95		
<b>E. &amp; O.E</b>	<b>Due to us</b>			<b>R40 386,60</b>

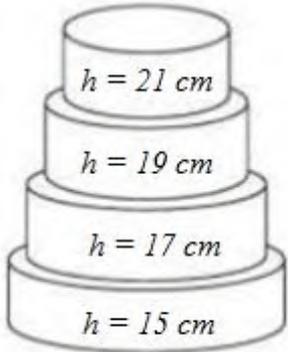
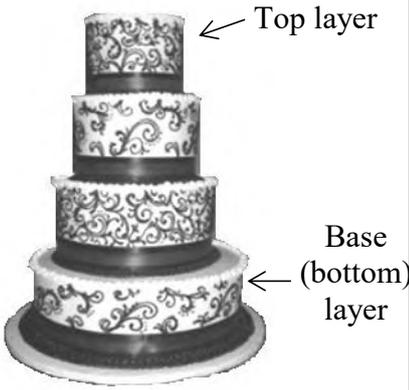
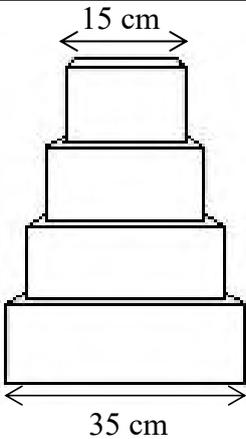
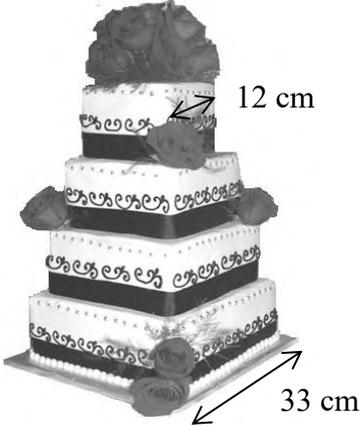
[Adapted from [www.srvwinpsw006.wf.uct.ac.za](http://www.srvwinpsw006.wf.uct.ac.za)]

Details\*: Balances/interest/course code/course name

ANNEXURE B ND 18

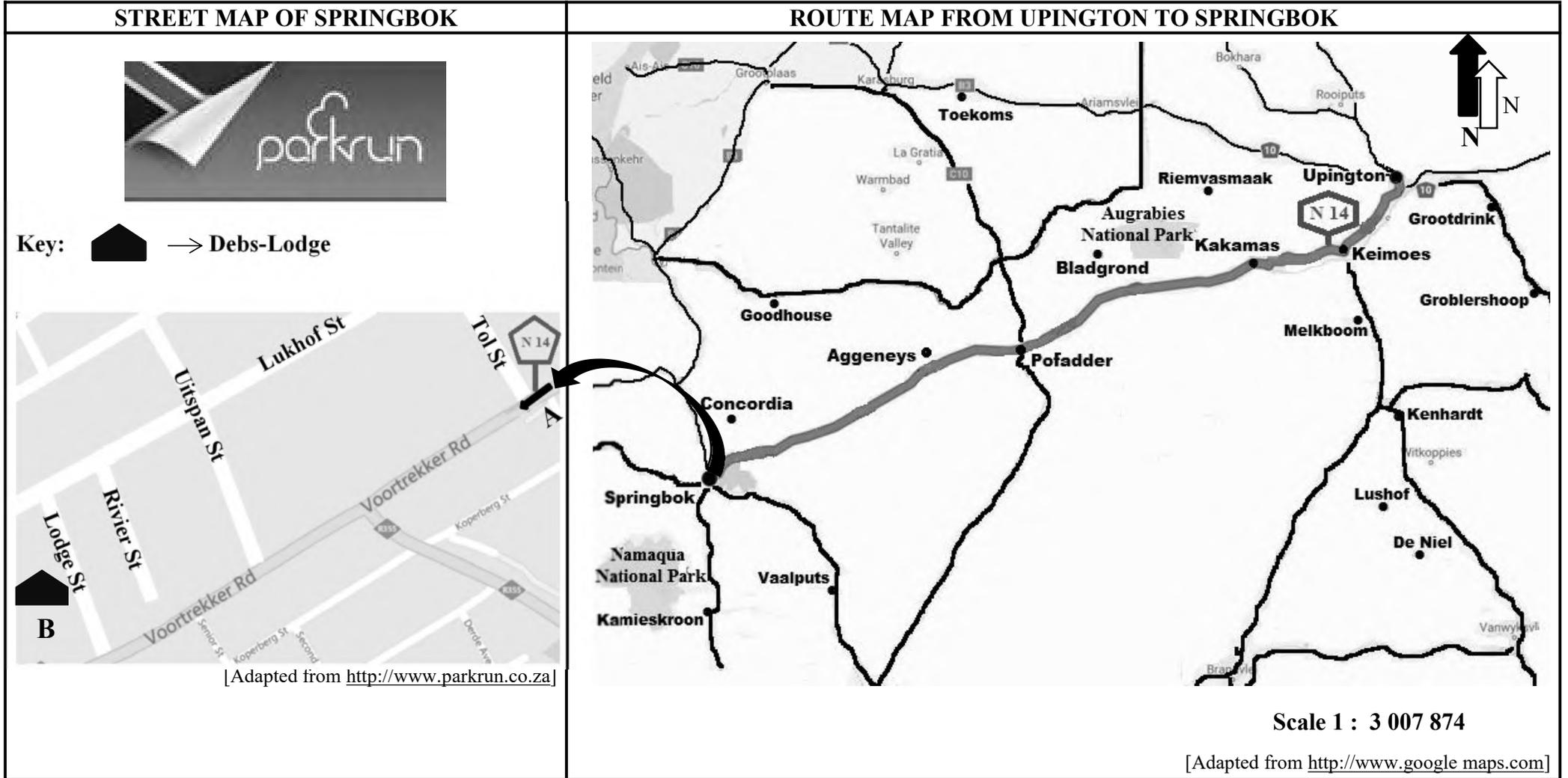
QUESTION 3.1

FOUR-LAYER RED VELVET WEDDING CAKES

<b>AMY'S FOUR-LAYER CYLINDRICAL RED VELVET WEDDING CAKE</b>	
 <p>height = <math>h</math></p>	 <p>Top layer</p> <p>Base (bottom) layer</p>
<b>AMY'S FOUR-LAYER RECTANGULAR RED VELVET WEDDING CAKE</b>	
 <p>Length of top layer = 15 cm Length of bottom layer = 35 cm</p>	 <p>Width of top layer = 12 cm Width of bottom layer = 33 cm</p>

[Adapted from [www.pinterest.com](http://www.pinterest.com)]

ANNEXURE C ND 18  
QUESTION 4  
PARKRUN SOUTH AFRICA



QUESTION 1.1

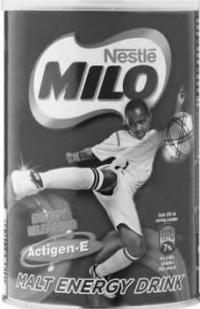
WOOLWORTHS FINANCIAL SERVICES				
				
<b>SUSAN VISSER</b> <b>PO BOX 271</b> <b>KIMBERLEY</b> <b>8300</b>		<b>STATEMENT DATE</b>	<b>14 Jan 2017</b>	
		<b>PAYMENT DUE DATE</b>	<b>8 Feb 2017</b>	
		<b>ACCOUNT NUMBER</b>	<b>6007 585 **** *</b>	
		<b>INSTALMENT FREQUENCY</b>	<b>Monthly</b>	
<b>LOAN STATEMENT</b>				
<b>TRANSACTION DETAILS</b>				
<b>DATE</b>	<b>STORE</b>	<b>DESCRIPTION</b>		<b>AMOUNT</b>
30 Dec 2016	Head Office	Debit order payment		443,27 CR
14 Jan 2017	Head Office	Monthly account fee		38,00
14 Jan 2017	Head Office	Total interest		221,82
		Fees and insurance		
		Opening balance	35,00	
		Payment	35,00-	
		Closing balance	38,00	
		Loan taken on 09/10/2015 over 36 months		
		Opening balance	2 658,20	
		Interest charged	55,05	
		Payments	153,46-	
		Closing balance	2 559,79	
		Loan taken on 29/04/2016 over 60 months		
		Opening balance	6 859,99	
		Interest charged	144,04	
		Payments	221,89 -	
		Closing balance	<b>A</b>	
		Loan taken on 10/10/2016 over 60 months		
		Opening balance	1 081,89	
		Interest charged	22,73	
		Payments	32,92-	
		Closing balance	1 071,70	
		Outstanding loan balance		10 451,63
		Loan amount available		548,37
		Next instalment due		446,27

[Adapted from Woolworths financial document]

ANNEXURE B MJ 19

QUESTION 2.1.4

PRICES AT A LOCAL STORE

	<p><b>MILO OPTION 1</b></p> <p>R97,95 per unit</p> <p>1 unit = 1 kg</p>		<p><b>PLASTIC SPOONS</b></p> <p>R12,75 for 50 plastic spoons</p>
	<p><b>MILO OPTION 2</b></p> <p>R1 140,95 for 12 units × 1 kg</p>		<p><b>SUGAR</b></p> <p>R33,20 per unit</p> <p>1 unit = 2,5 kg</p>
	<p><b>FOAM CUPS</b></p> <p>R1,78 for 1 foam cup</p>		<p><b>MILK</b></p> <p>R11,99 per unit</p> <p>1 unit = 1 ℓ</p>

[Adapted from [www.makro.co.za](http://www.makro.co.za)]



**SUGGESTED REVISION PROGRAMME**

<b>DATE</b>	<b>SECTIONS</b>
22 July	Income, Expenditure, profit/ loss, Profit margin, Budgeting
23 July	Interest (interest rate, simple & compound interest)
24 July	Taxation (VAT, UIF, Income tax)
25 July	Exchange rates, Inflation
26 July	<b>CLASS TEST ON FINANCE</b>
29 July	Substitution into a given formulae/ equation and construction of equations.
30 July	Draw graphs including, fixed (horizontal/ vertical), linear, Inverse proportion, Step functions
31 July	Interpret tables and graphs. Identify and estimate the break- even point.
01 Aug	<b>CLASS TEST ON FINANCE</b>
02 Aug	Developing questions and collecting data
05 Aug	Classifying and organising multiple sets of data
06 Aug	Summarising data
07 Aug	Representing data
08 Aug	Interpreting and analysing data
12 Aug	Probability
13 Aug	<b>CLASS TEST ON DATA HANDLING</b>
14 Aug	Measuring length and distance, mass (weight),
15 Aug	Measuring volume
16 Aug	Calculating perimeter, area and volume.
19 Aug	Measuring temperature
20 Aug	<b>CLASS TEST ON MEASUREMENT</b>
21 Aug	Time
22 Aug	Scale: Bar and number scale
23 Aug	Maps (All types of maps)
26 Aug	Plans (Instruction/assembly diagram)
27Aug	Plans (Floor, elevation and design plans)
28 Aug	Models
	<b>TERM 3 CONTROL TEST [100 Marks]</b>