basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2014

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages, 2 annexures and 4 answer sheets.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.

2. Answer QUESTION 3.2.4, QUESTION 4.1.7, QUESTION 5.1.2 and QUESTION 5.2.1 on the attached ANSWER SHEETS. Write your centre number and examination number in the spaces on the ANSWER SHEETS. Hand in the ANSWER SHEETS with your ANSWER BOOK.

3. Number the answers correctly according to the numbering system used in this question paper.

4. Start EACH question on a NEW page.

5. You may use an approved calculator (non-programmable and non-graphical), unless otherwise stated.

6. Show ALL the calculations clearly.

7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.

8. Indicate units of measurement, where applicable.

9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.

10. Write neatly and legibly.

QUESTION 1

1.1 Valley High School needs a new stove for their Consumer Studies kitchen. The Consumer Studies teacher, Miss Van Dyk, obtained the following information from two stores for the school to consider. (Some of the details have been omitted.)

ASDA KITCHEN APPLIANCES

4-plate compact electric stove
No installation needed – plug in and use

New selling price
R1 989
SAVE R210

Hire-purchase Option
Deposit R199
R88 × 30 months
Total cost R...
at 19% interest per annum

KITCHEN PRO

4-plate gas/electric stove
Electric oven with convection function

Selling price
R2 100
Get 5% discount for cash

Hire-purchase Option
15% deposit
R... × 24 months
Total cost R2 443,49 (excluding deposit) at 17% interest per annum

1.1.1 Write down the annual interest rate charged by Kitchen Pro. (2)

1.1.2 Calculate:

(a) The monthly instalment for the stove from Kitchen Pro (2)

(b) The original selling price of the stove from ASDA Kitchen Appliances before the price was reduced (2)

(c) The deposit amount if they purchase the stove from Kitchen Pro (2)

(d) The total cost of the stove from ASDA Kitchen Appliances if the hire-purchase option is chosen. (4)

1.2 Miss Van Dyk bought supplies for a practical lesson for her Grade 10 learners. The till slip is shown on ANNEXURE 1. (Some of the amounts on the till slip have been omitted.)

Use the till slip on ANNEXURE 1 to answer the following questions:

1.2.1 Name the non-vegetable item that is exempted from VAT. (2)

1.2.2 Determine the number of tins of Value condensed milk bought. (3)

1.2.3 Calculate the missing value **A**. (2)

1.2.4 Determine the approximate period the supermarket allows for refunding. (2)

1.2.5 Calculate the price per kilogram of sweetcorn. (3)

1.2.6 Calculate the total cost of the items that are exempted from VAT. (2)

1.2.7 Frank's Supermarket rounded off the total amount due to the nearest 5 cents.

(a) Calculate the missing value **B**. (2)

(b) Miss Van Dyk paid for the items with one R200 note and two R100 notes. Determine the missing values **C** and **D**. (3)

1.2.8 Frank buys tomatoes from his supplier at a cost of R12,00 per bag. He then sells them at R14,99 per bag.

(a) Calculate his profit on tomato sales if he sells one dozen bags of tomatoes. (4)

(b) Determine the percentage mark-up, rounded to the nearest whole percentage, that Frank uses to determine the selling price of the tomatoes.

You may use the following formula:

$$\textbf{Percentage mark-up} = \frac{\textbf{selling price} - \textbf{cost price}}{\textbf{cost price}} \times \textbf{100\%}$$

(3)

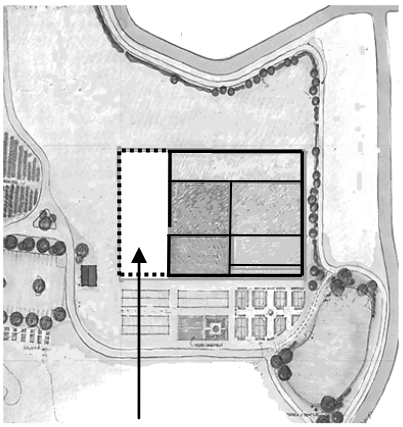
[38]

QUESTION 2

2.1 Tina is a livestock and vegetable farmer. She added a new rectangular butternut field to her existing rectangular vegetable fields by extending the length of her existing field by 33 m. The existing vegetable fields are enclosed with a fence with a gate. The fence is necessary to keep out livestock and to provide security.

The farm and vegetable field layout plans are shown below.

Layout of Tina's farm showing the existing and new vegetable fields

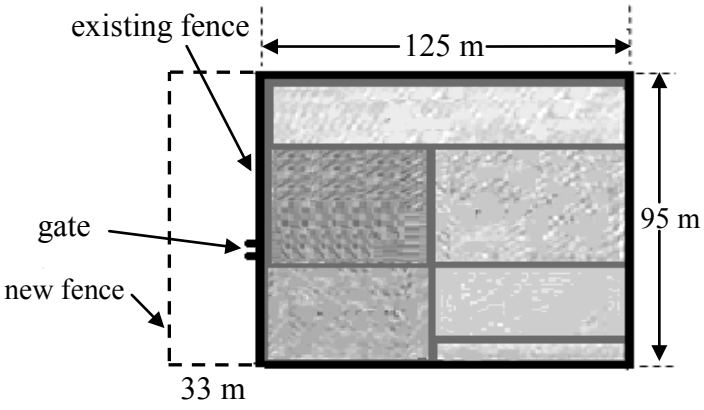


New butternut field

New butternut field

Existing vegetable field

Detailed layout of the existing fenced vegetable fields and the new vegetable field



[Source: www.kcfresh.wordpress.com]

2.1.1 Use the layout plans to determine the number of vegetable fields Tina will now have on her farm. (2)

2.1.2 Tina has to fence in the new field. She will have to buy additional poles and wire for the fencing. To save on costs she will also use her existing wire fence and gate to erect the new fence.

Calculate:

(a) The length of wire fencing (sold in 5 m rolls only) she needs to buy so that the new butternut field is also enclosed (3)

(b) The number of additional poles she needs to buy if the poles are planted 1,5 m apart (3)

2.1.3 Write down the ratio of the total length of the existing vegetable fields to the total length of the new extended vegetable fields. (2)

2.1.4 Calculate the total area of Tina's new extended vegetable fields.

You may use the following formula:

Area of a rectangle = length × width (3)

2.2 Tina investigates the possibility of installing a cylindrical water storage tank on her farm. This will allow her to store rainwater for use during the dry seasons. She found the following data about water tanks on the Internet.

Cylindrical water storage tank

WATER STORAGE TANKS		
Volume* ℓ	**Diameter mm**	**Height mm**
1 000	1 100	1 300
1 500	1 150	1 700
2 000	1 200	1 900
2 500	1 450	1 700
5 000	1 840	2 000
5 500	1 800	2 300
10 000	2 200	3 000
*** Approximate values**		

$1\ m^3 = 1\ 000\ \ell$

NOTE: The actual volume of the tanks is generally greater than the listed volume.

[Source: www.capewatersolutions.co.za]

2.2.1 Convert the diameter of a 10 000 ℓ tank to metres. (2)

2.2.2 If the height of the cylindrical section of the 10 000 ℓ tank is 3 m, calculate the actual volume (in litres) of the tank.

You may use the following formula:

Volume of a cylinder = $\pi \times$ (radius)$^2 \times$ height, where $\pi = 3{,}142$ (5)

2.3 Tina has a greenhouse in which she grows strawberries. The sprinkler system in the greenhouse sprays a fine mist to ensure the strawberries get enough water. The strawberries are watered for a total of 2 hours and 45 minutes every day and the temperature in the greenhouse is kept constant at 25 °C.

The clock below shows the time each morning when the sprinkler system is switched off.

2.3.1 Determine the time the sprinkler system is switched on. (3)

2.3.2 The thermometer Tina uses is calibrated in degrees Fahrenheit.

Determine the temperature reading on her thermometer if the required constant temperature of 25 °C has to be maintained.

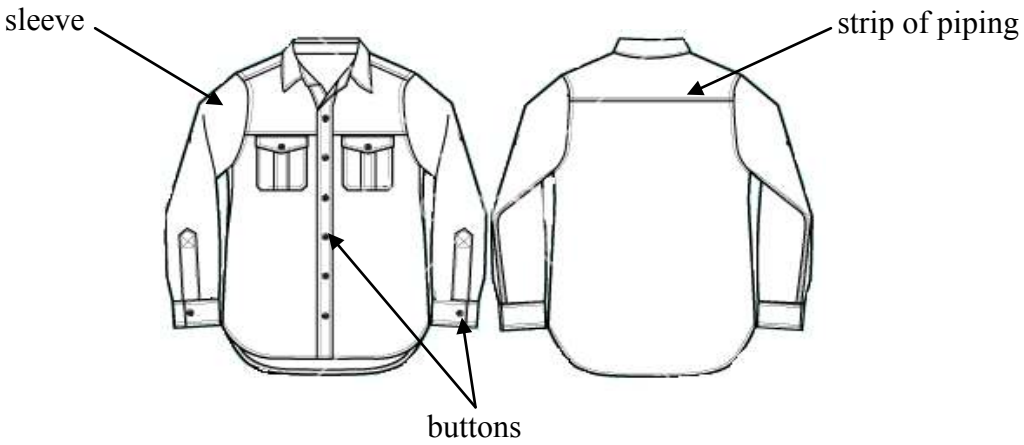
You may use the following formula:

Temperature in °F = (1,8 × °C) + 32° (3)
[26]

QUESTION 3

3.1 Thulabone is a clothing designer. Below is a scale diagram of a shirt he designed.

Scale diagram of the designed shirt



Scale 1 : 18

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

3.1.2 Calculate the scaled length (in mm) of the sleeve if its actual length is 486 mm. (2)

3.1.3 Determine the actual number of buttons required for this shirt. (2)

3.1.4 Thulabone wants to sew a single strip of piping on the back of the shirt as shown in the diagram.

Calculate the actual length (in mm) of the strip of piping required. (3)

3.1.5 State on which side the buttons must be sewn on the front of the shirt. (2)

3.2 Jabu is a Hospitality Studies teacher at Yo-yo High School. She has to convert one of the classrooms into a cafeteria for the school. The classroom desks will be replaced by 4-seater tables as shown in the photograph alongside.

The side length of each square table is 90 cm. When not occupied each chair occupies a square area of 60 cm by 60 cm measured from the edge of the table.

Cafeteria of Yo-yo High School showing a 4-seater table and chairs

ANSWER SHEET A shows a top view of the layout of the tables and chairs in the cafeteria of Yo-yo High School when it is not occupied.

The sets of tables with chairs must be 50 cm apart when not occupied (as shown on the layout plan).

The side length of the square classroom is 900 cm.

Use the layout plan on ANSWER SHEET A to answer the following questions.

3.2.1 Calculate the missing length **K**. (2)

3.2.2 Determine the maximum number of persons that can be seated in the cafeteria. (2)

3.2.3 Calculate the missing length **T**, the shortest distance between the southern wall and the furthest point of the chair at Table 3. (4)

3.2.4 During a practical examination a learner waiter is standing at position **X** on the layout plan, facing north. He has to move from position **X** to position **Y** to serve a customer seated at Table 8.

He takes the following route:

- He walk northwards between two pairs of tables.
- He then turns left and walks between Tables 5 and 6 until he reaches the customer at Table 8.

Indicate the route described above on ANSWER SHEET A. (2)

3.2.5 Write down the compass direction of Table 9 relative to the door. (2)

3.2.6 Jabu is also looking at another possible layout for the cafeteria where two tables are joined with six chairs around the tables.

If Jabu only uses 24 chairs, how many tables will she need for the new layout plan? (2)

[25]

QUESTION 4

4.1

In October 2013 the South African National Roads Agency Limited (Sanral) published e-toll tariffs. These tariffs apply to different classes of vehicles and different types of users relating to the Gauteng Freeway Improvement Project (GFIP).

Drivers who use Gauteng freeways have a choice to register as a user and receive an e-tag or to be a non-registered user.

Billboard with e-tag tariffs for registered users

TABLE 1 on ANNEXURE 2 shows the tariffs for both registered and non-registered users for some e-toll gantries.

[Source: *Government Gazette No. 36912*]

Use TABLE 1 on ANNEXURE 2 to answer the following questions.

4.1.1 Write down the e-toll tariff for a non-registered user who passes through the Ukhozi gantry and drives a Class B vehicle. (2)

4.1.2 Write down the names of the gantries that show the highest tariffs for registered e-tag users driving Class B vehicles. (2)

4.1.3 Refer to the tariffs for registered e-tag users driving Class B vehicles to answer the following questions.

(a) Calculate the mean e-toll tariff. (4)

(b) Determine the median e-toll tariff. (3)

(c) Hence state, giving a reason, whether the mean e-toll tariff or the median e-toll tariff best represents these tariffs. (3)

4.1.4 Calculate the difference in e-toll tariffs between the Sunbird and Fiscal gantries for non-registered users driving Class A2 vehicles. (3)

4.1.5 Write down the ratio of the e-toll tariffs for registered e-tag users driving Class A2 vehicles to registered e-tag users driving Class B vehicles if both pass through the Owl gantry. (2)

4.1.6 Calculate the amount that a non-registered user of a Class A2 vehicle passing through the Pikoko gantry could have saved if he had been registered. (2)

4.1.7 ANSWER SHEET B shows a bar graph representing the e-toll tariffs of five selected e-toll gantries for registered e-tag users driving Class B vehicles.

Draw, on the same grid on ANSWER SHEET B, a bar graph representing the e-toll tariffs for non-registered users driving Class B vehicles for the same five e-toll gantries. (Use the unshaded columns.) (5)

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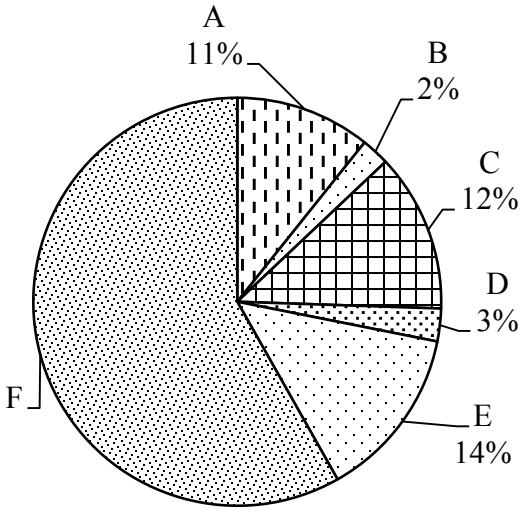
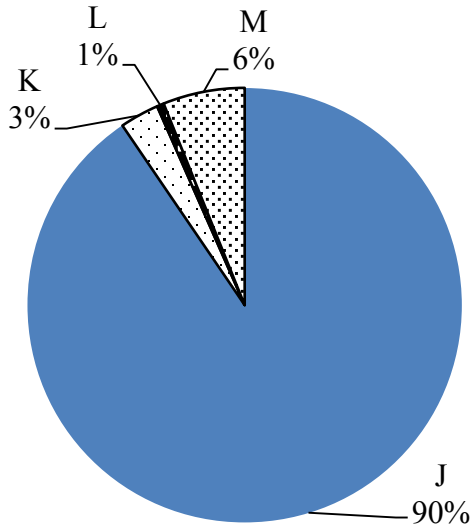
4.2 The Mangaung Metropolitan Municipality receives funding for its capital projects from various sources. The pie charts below show the various sources of funding and the capital expenditure for projects during 2011/2012.

PIE CHART X: FUNDING SOURCES FOR 2011/2012



PIE CHART Y: CAPITAL EXPENDITURE FOR PROJECTS FOR 2011/2012



Key: FUNDING SOURCES

A	Municipal infrastructure grant
B	Department of Minerals and Energy grant
C	Capital replacement reserves
D	Public contributions and donations
E	External loans
F	Other grants and subsidies

Key: PROJECTS

J	Infrastructure
K	Sports fields
L	Recreation facilities
M	Other

[Adapted from www.mangaung.co.za]

4.2.1 Identify the second biggest funding source that contributes to the municipality's budget for capital projects. (2)

4.2.2 Calculate the percentage contribution of other grants and subsidies to the municipality's budget for capital projects. (2)

4.2.3 Calculate the value of the external loans if the total amount obtained from the funding sources was R587 646 376,00. (3)

4.2.4 On which project did the municipality spend the least? (2)

4.2.5 The municipality has a contract to spend R28 401 736,00 of their funds on infrastructure. Write down this contract amount in words. (2)

[37]

QUESTION 5

5.1 Rafique is the driver of a metered taxi. The company he works for charges the following fare for a single trip:

- A minimum call-out fee of R50 per trip with the first three kilometres free
- Thereafter, R12,00 for each additional kilometre or part thereof

[Source: www.taxiautofare.com]

5.1.1 Write down an equation that Rafique can use to calculate the total cost (in rand) per single trip, in the form:

Total cost (in rand) per single trip = ... (3)

5.1.2 TABLE 2 below shows the total cost per single trip for different distances travelled.

TABLE 2: Total cost per single trip for different distances travelled

Distance (in km)	0	1	3	5	10	20	30
Total cost per single trip (in rand)	0	50	50	74	134	254	374

Use TABLE 2 to draw a line graph on ANSWER SHEET C showing the total cost per single trip. (5)

5.1.3 A client pays Rafique R1 214 for a single trip.

Determine the distance travelled during this trip. (4)

5.1.4 Mrs Mkhize hires a taxi from this company to take her to a meeting venue 5 km from her home. The meeting is scheduled to take exactly ONE hour and she requests that the taxi wait for her to take her back home.

The company charges an extra R100,00 per hour if the taxi has to wait for a client and the trip will be charged as a single trip.

Calculate the total taxi fare Mrs Mkhize will pay for this trip. (5)

5.2 Rafique is a soccer fan and he wants to use his knowledge of Mathematical Literacy to understand the possible outcomes of a game.

The possible outcomes of a soccer game are WIN (W), DRAW (D) or LOSE (L).

The team that Rafique supports still has to play two games.

5.2.1 An incomplete tree diagram on ANSWER SHEET D shows the possible outcomes of the two games that still have to be played.

Write down the missing information in the spaces provided on ANSWER SHEET D. (3)

5.2.2 The probability of Rafique's team losing both games is $\frac{1}{9}$.

Which ONE of the following statements (A, B or C) best describes this probability?

A There is **no chance** of the team losing both games.

B There is a **certainty** of the team losing both games.

C There is a **possibility** of the team losing both games. (2)

5.2.3 The tree diagram on ANSWER SHEET D shows the possible outcomes of the last two games.

Use this tree diagram to determine the probability that the team will win at least one of the two games that still have to be played. (2)

[24]

TOTAL: 150

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ANNEXURE 1

QUESTION 1.2

FRANK'S SUPERMARKET
Welcome to our store!
A9 Daven Avenue
Beacon Bay, East London
Tel No.: 043 711 11**
VAT Reg. No.: ****2216
Customer Helpline: 0860 00* 00*

Last day for full refund is
12/12/2013 except for SALE items

# Organic Carrots 1 kg	R 14,99
White Huletts Sugar 2,5 kg @ R23,95	
Less promotion R2,00	R 21,95
Value Condensed Milk @ R16,95	
Less promotion R1,00	R 159,50
# 1 ℓ Clover Milk	R 9,95
# Sweetcorn 135 g	R 19,95
# Rosa Tomatoes 400 g	R 14,99
# Red Salad Onions 10 g	R 14,99
Sliced Cooked Ham 250 g	R 46,99
Dove Fresh Touch Soap	R 8,29
# Cabbage	R 6,99
TOTAL (including VAT)	**A**
TOTAL (excluding VAT)	**R289,52**
VAT	**R29,07**
TOTAL DUE (rounded off)	**B**
AMOUNT TENDERED	**C**
CHANGE	**D**

Non-VAT Items
12-10-2013 16:45 Nondumiso

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ANNEXURE 2

QUESTION 4.1

An e-toll gantry is a framework built over a road which electronically bills a user each time a vehicle passes through the gantry as shown in the photograph alongside.

Photograph of an e-toll gantry

TABLE 1 below shows the tariffs for some e-toll gantries on the N1.

NAME OF GANTRY	TARIFFS INCLUDING VAT (IN RAND)			
	*Registered e-tag users		Non-registered users	
	**Class A2 vehicle	***Class B vehicle	Class A2 vehicle	Class B vehicle
Barbet	3,00	7,50	5,80	14,50
Mossie	3,00	7,50	5,80	14,50
Indlanzi	2,91	7,28	5,63	14,07
Pikoko	2,91	7,28	5,63	14,07
Ivusi	2,76	6,90	5,34	13,34
Flamingo	2,76	6,90	5,34	13,50
Ihobhe	3,36	8,40	6,50	16,24
Sunbird	3,36	8,40	6,50	16,20
Tarentaal	2,58	6,45	4,99	12,50
Blouvalk	2,58	6,45	4,99	12,47
Owl	3,21	8,03	6,21	15,52
Pelican	3,21	8,03	6,21	15,52
King Fisher	2,85	7,13	5,51	13,78
Ukhozi	2,85	7,13	5,51	13,78
Fiscal	2,52	6,30	4,87	12,00
Stork	2,52	6,30	4,87	12,18
Ilowe	0,60	1,50	1,16	2,90

[Adapted from *Government Gazette No. 36912*]

***Registered e-tag user** – An individual or business whose make and model of vehicle, and personal and banking details have been registered with Sanral for e-toll payment.
****Class A2 vehicle** – Light motor vehicle
*****Class B vehicle** – Small heavy motor vehicle

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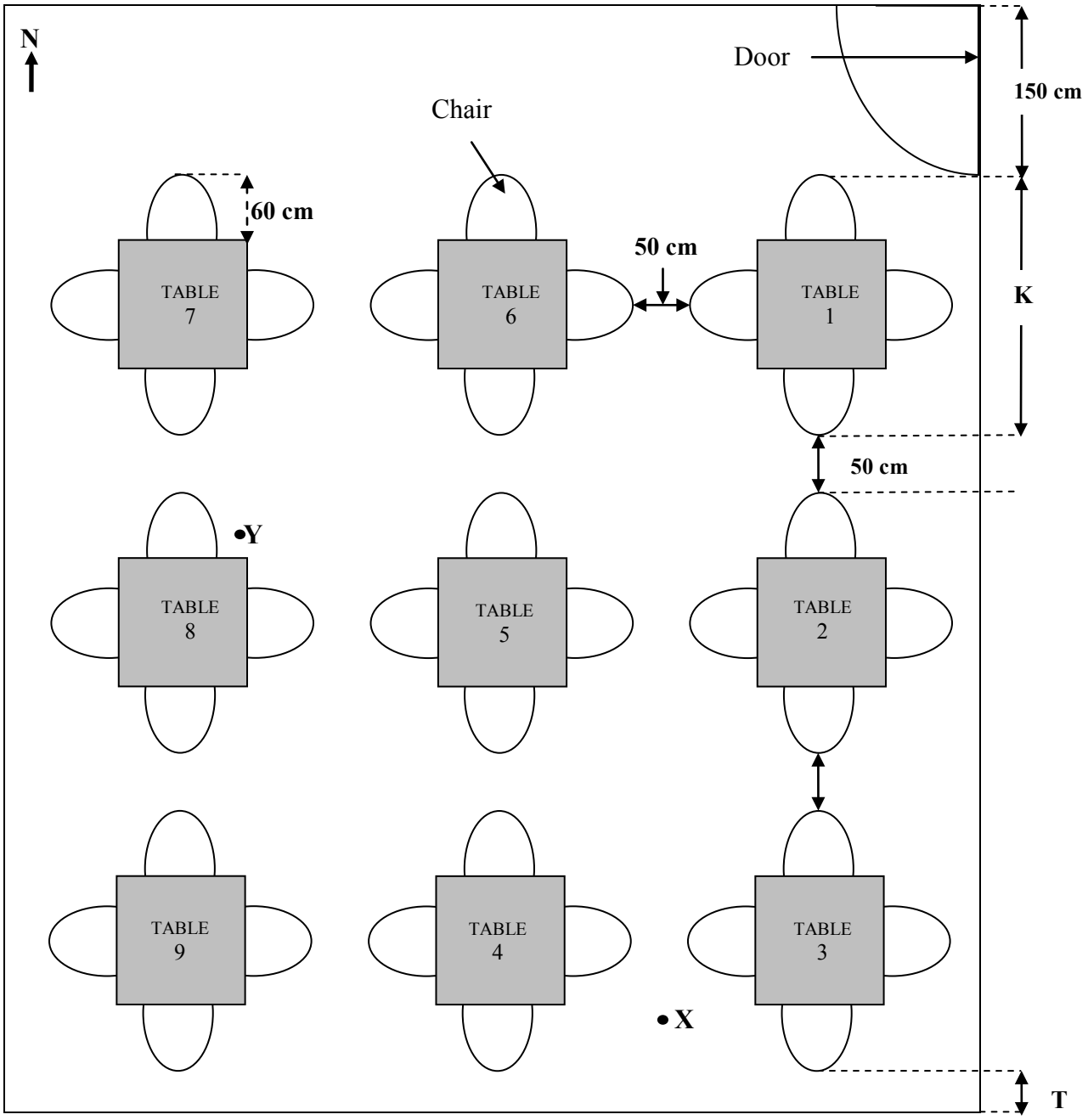
ANSWER SHEET A

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

QUESTION 3.2.4

Top view of the layout of the cafeteria when not occupied



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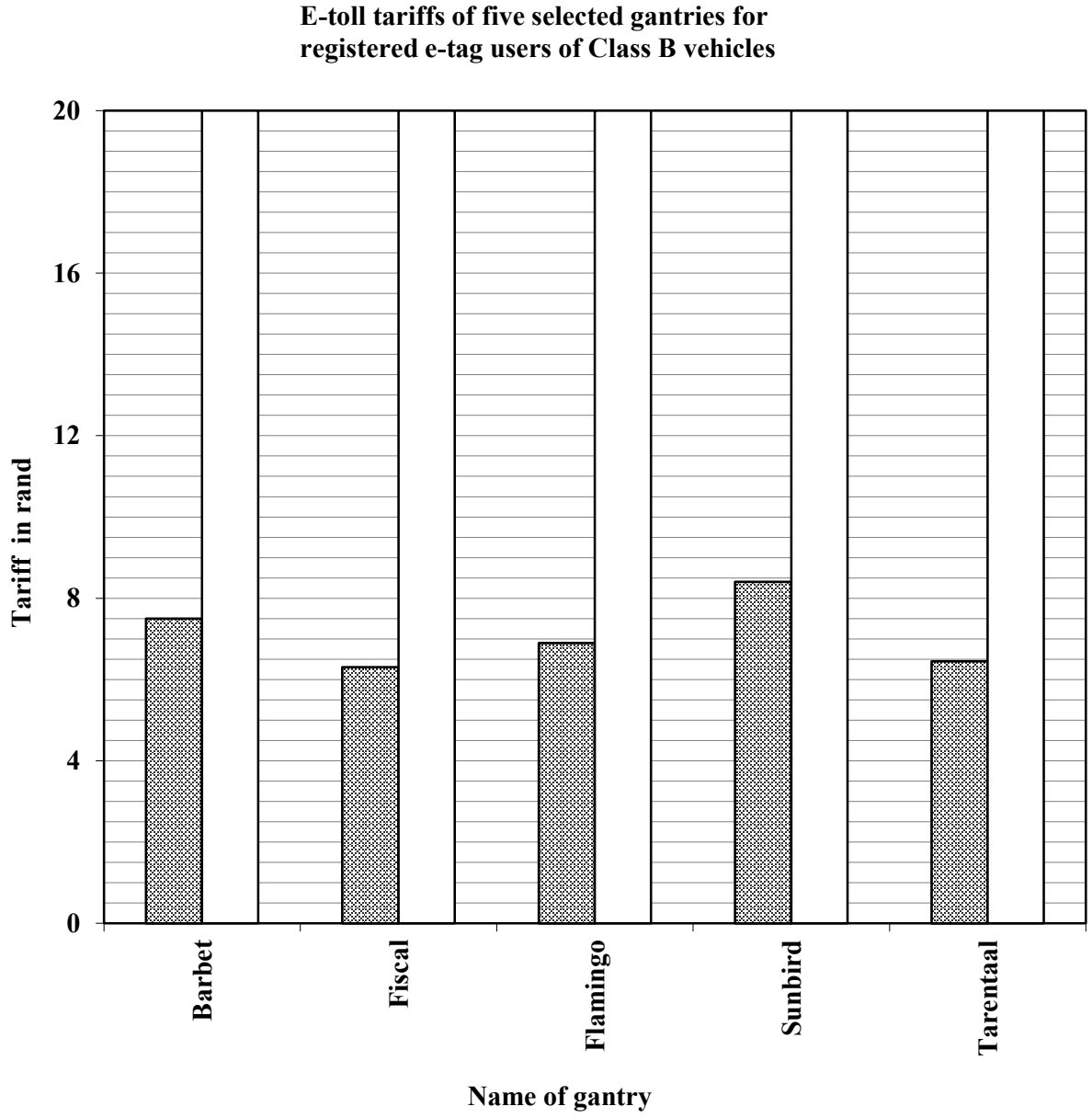
ANSWER SHEET B

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

QUESTION 4.1.7



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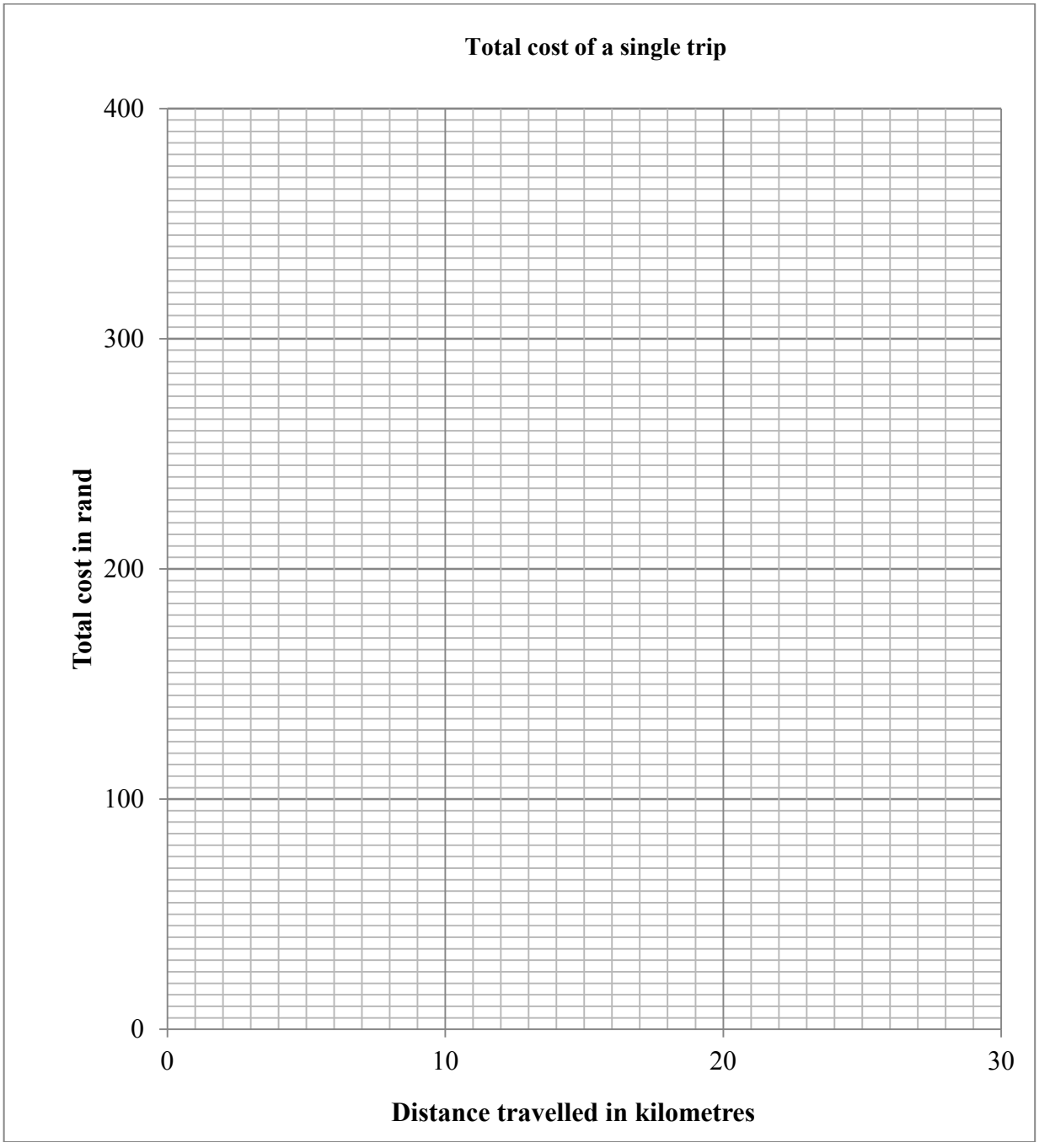
ANSWER SHEET C

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

QUESTION 5.1.2

Distance (in km)	0	1	3	5	10	20	30
Total cost per single trip (in rand)	0	50	50	74	134	254	374



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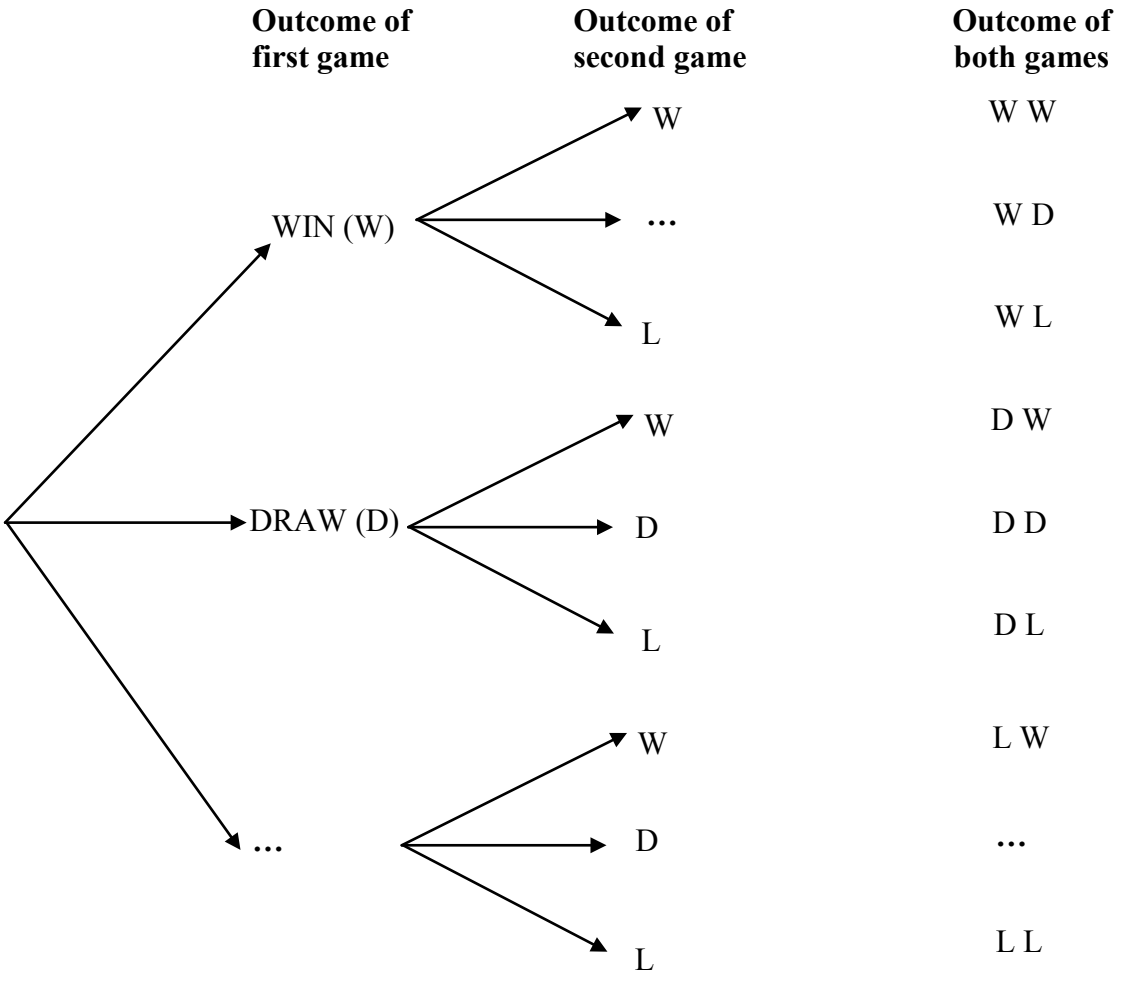
ANSWER SHEET D

CENTRE NUMBER: | | | | | | | | |

EXAMINATION NUMBER: | | | | | | | | | | | | | |

QUESTION 5.2.1



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REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2014

MEMORANDUM

MARKS: 150

SYMBOL	EXPLANATION
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RD	Reading from table/Reading from graph/Reading from diagram
SF	Substitution in a formula
RO	Rounding off
NPR	No penalty for rounding
J	Justification /Reason
NO PENALTY IF UNITS OMITTED UNLESS STATED OTHERWISE	

This memorandum consists of 22 pages.

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KEY TO TOPIC SYMBOLS:
F = Finance; M = Measurement; MP = Maps, Plans and other representations;
DH = Data Handling; P = Probability

QUESTION 1 [38]			
Ques	**Solution**	**Explanation**	**Topic**
1.1.1	17 % ✓✓RD **OR** 0,17 ✓✓RD **OR** $\frac{17}{100}$ ✓✓RD	2 RD reading from diagrams Max 1 mark for 17 (2)	**F** L1
1.1.2 (a)	R2 443,49 ÷ 24✓M/A = R101,81✓CA **Accept correct answer only**	1M/A division by 24 1CA only if using R2 100 **NPR** (2)	**F** L1
1.1.2 (b)	Original selling price = R1 989 + R210 ✓M/A = R2 199 ✓A **Accept correct answer only**	1M/A adding 1A simplify (2)	**F** L1
1.1.2 (c)	15% × R2 100 **OR** $\frac{15}{100}$ × R2 100 ✓M/A **OR** 0,15 × R2 100 = R315 ✓CA **Accept correct answer only**	1M/A multiplying 1CA simplify (2)	**F** L1

Ques	Solution	Explanation	Topic
1.1.2 (d)	✓RD Total payment = R88 × 30 months = R2 640 ✓M/A ✓M Total cost = R199 + R2640 = R2 839 ✓CA **Accept correct answer only**	1RD reading values from advert 1M/A multiplication 1M addition of R199 1CA simplify Accept R2 839,25 if the formula for Simple Interest is used (4)	**F** L1(2) L2(2)
1.2.1	Clover **milk** ✓✓A	2A correct item Full marks if answer is given as l ℓ (liter) OR milk only (2)	**F** L2
1.2.2	Cost of 1 tin of condensed milk = R16,95 – R1,00 = R15,95 ✓M/A Number of tins of condensed milk ✓M = R159,50 ÷ R15,95 = 10 ✓CA **OR** Cost of 1 tin of condensed milk = R159,50 ÷ R16,95 ✓M = 9,4 Number of tins of condensed milk ≈10✓✓RO **Accept correct answer only**	1M/A subtracting 1M division 1CA no. of tins **OR** 1M division by R16,95 2 RO to 10 Max 1 mark for 9,4 with calculations Max 2 marks for 9 with calculations (3)	**F** L1

Ques	Solution	Explanation	Topic
1.2.3	✓M ✓A **A** = R289,52 + R29,07 = R318,59 **OR** ✓M **A** = 14,99 + 21,95 + R159,50 + R9,95 + R19,95 + R14,99 + R14,99 + R46,99 + R8,29 + R6,99 = R318,59 ✓A **Accept correct answer only**	1M adding 1A simplify 1M adding 1A simplify 1 mark if one value is omitted (2)	**F** L1
1.2.4	12/10/2013 till 12/12/2013 ✓RD = 2 months ✓A **OR** 61 days **OR** 62 days **OR** 60 days **Accept correct answer only**	1RD Reading from slip 1A simplify Accept 2 or 3 days Max 1 mark for until (or up to) 12/12/2013 (2)	**F** L1
1.2.5	135 g ÷ 1000 = 0,135kg ✓C R19,95 ÷ 0,135 kg ✓M = R147,78 ✓CA **OR** R19,95 ÷ 135 g = R0,1477… per gram ✓M ✓C R0,14777… × 1 000 g = R147,78 **OR** ✓C 135 g : 1 000 g R19,95 : *x* ✓M ✓CA *x* = R19,95 × 1 000 ÷ 135 = R147,78 **Accept correct answer only**	1C Convert to kg 1M Dividing 1CA cost per kg **OR** 1M Dividing 1C convert to kg 1CA cost per kg **OR** 1C Convert to g 1M multiply & divide 1CA cost per kg (3)	**F** L1

Ques	Solution	Explanation	Topic
1.2.6	✓M R14,99 + R9,95 + R19,95 + R14,99 + R14,99 + R6,99 = R81,86 ✓A **OR** ✓M R318,59 – (R21,95 + R8,29 + R46,99 + R159,50) = R318,59 – R236,73 = R81,86 ✓A **Accept correct answer only**	1M adding values 1A simplify **OR** 1M adding values 1A simplify If one value is omitted only 1 mark (2)	**F** L1
1.2.7 (a)	**B** = R318,59 round down ✓CA =R318,55✓CA **OR** **B** = R318,59 round up ✓CA =R318,60 ✓CA **Accept correct answer only**	1CA identify correct value for rounding 1CA rounding down from Q 1.2.3 **OR** 1CA identify correct value for rounding 1CA rounding up from Q 1.2.3 (2)	**F** L1
1.2.7 (b)	**C** = R200 + (2 × R100) = R400✓M/A ✓M **D** = R400 – R318,55 = R81,45✓CA ✓M **OR** **D =** R400 – R318,60 = R81,40 ✓CA **Accept correct answer only**	1M/A adding money 1M Subtracting 1CA from Q 1.2.7(a) **OR** 1M Subtracting 1CA from Q 1.2.7(a) (3)	**F** L1

Ques	Solution	Explanation	Topic
1.2.8 (a)	✓M Profit per packet = R14,99 – R12,00 = R2,99 ✓A ✓A Profit per dozen = 12 × R2,99 = R35,88 ✓CA **OR** Cost price per dozen = 12 × R12,00 = R144 ✓A Selling price per dozen = 12 × R14,99 = R179,88 ✓A Profit per dozen = R179,88 – R144 ✓M = R35,88 ✓CA	1M calculate profit per packet 1A profit 1A multiply by 12 1CA profit of 1 dozen **OR** 1A cost price per dozen 1A selling price per dozen 1M calculate profit per dozen 1CA profit (4)	**F** L1
1.2.8 (b)	Percentage mark up $= \frac{\text{selling price} - \text{cost price}}{\text{cost price}} \times 100\%$ $= \frac{R14,99 - R12,00}{R12,00} \times 100\ \%$ ✓SF = 24,916 % ✓A ≈ 25 % ✓RO **OR** Profit = R14,99 – R12,00 = R2,99 ✓M Percentage profit = $\frac{R2,99}{R12,00} \times 100\ \%$ = 24,916 % ✓M ≈ 25 % ✓RO **Accept correct answer only**	1 SF substitute in formula 1A simplify 1RO rounding to whole percentage **OR** 1M profit 1M % profit simplify 1RO rounding to whole percentage (3)	**F** L2
			[38]

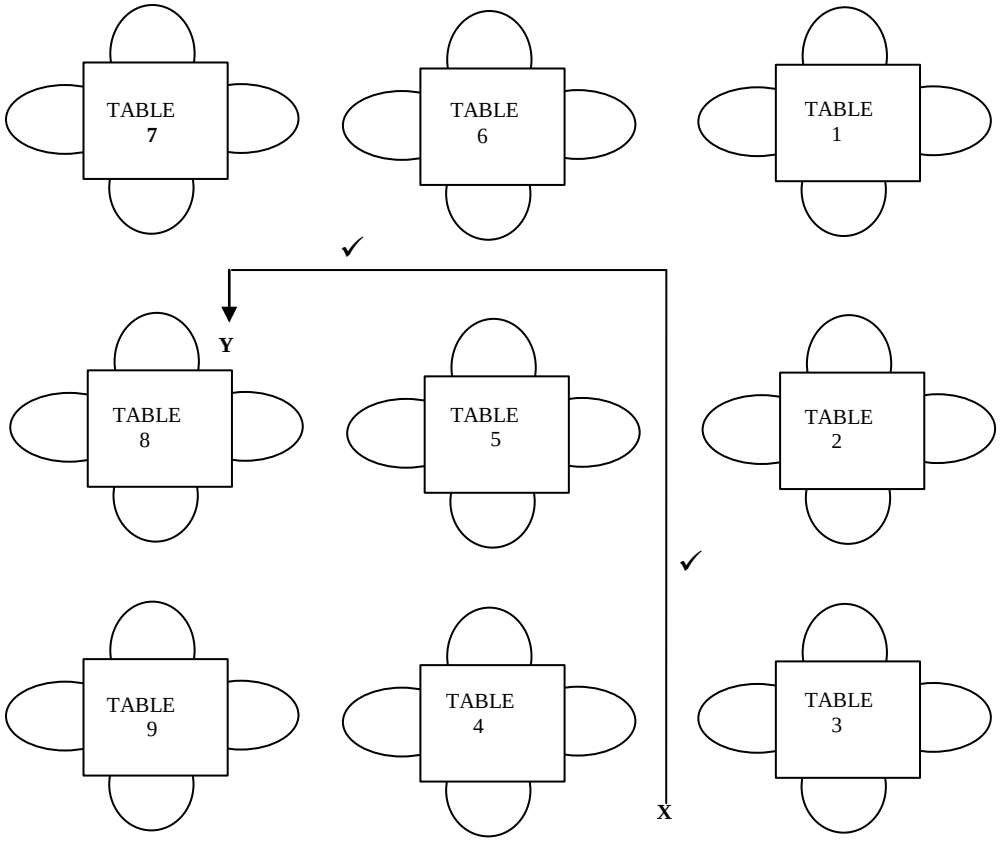
QUESTION 2 [26]			
Ques	**Solution**	**Explanation**	**Topic**
2.1.1	7 ✓✓A	2A number of fields Accept 2 as answer (2)	**M** L1
2.1.2 (a)	✓M Length of fencing = 33 m + 33 m = 66 m ✓A Total length to buy = 70 m ✓RO **OR** 14 rolls **OR** ✓M Length of fencing = 33 m × 2 = 66 m ✓A Total length to buy = 70 m ✓RO **OR** 14 rolls **Accept correct answer only**	1M addition 1A length 1RO rounding to nearest 5 **OR** 1M multiplying by 2 1A length 1RO rounding to nearest 5 Max 2 marks for 165m or 33 rolls (3)	**M** L1
2.1.2 (b)	✓M ✓M ✓CA Number of poles = 66 m ÷ 1,5 m = 44 poles **OR** ✓M ✓M ✓CA Number of poles = (33 ÷ 1,5) × 2 = 44 poles	1M using 66 m 1M dividing by 1,5 1CA no. of poles as whole number from Q 2.1.2 (a) **OR** 1M divide by 1,5 1M multiply by 2 1CA no. of poles as whole number from Q 2.1.2 (a) (3)	**M** L1
2.1.3	New length = 125 m + 33 m = 158 m ✓A Length of old field : Length of extended field 125 : 158 ✓M **Accept correct answer only**	1A length 1M writing as a ratio using at least 125 (2)	**M** L2
Ques	**Solution**	**Explanation**	**Topic**

2.1.4	Area = 158 m × 95 m ✓SF ✓ CA = 15 010 m^2 ✓A	1SF substitution 1CA area 1A unit of m^2 (3)	**M** L1(1) L2(2)
2.2.1	✓RT Diameter = 2 200 mm ÷ 1 000 = 2,2 m✓A **Accept correct answer only**	1RT 2200 mm 1A diameter in m (2)	M L1
2.2.2	Radius = 1,1 m ✓CA Volume = 3,142 × $(1,1)^2$ × 3 ✓SF = 11,40546 m^3 ✓CA = 11,40546 m^3 × 1 000 ℓ/m^3 ✓C = 11 405,46 litres ✓CA **OR** Radius = 1,1 m ✓CA ✓C Volume = 3,142 × $(1,1)^2$ × 3000 ✓SF = 11 405,46 litres ✓✓CA	1CA radius from Q 2.2.1 1SF substitution 1CA volume 1C multiply by 1 000 1CA litres **OR** 1CA radius from 2.2.1 1C multiply by 1 000 1SF substitution 2CA litres Max 3 marks if calculation is simplified (with out squaring) (5)	M L2

Ques	Solution	Explanation	Topic
2.3.1	Time = 11:56 ✓RD ✓M Time it switched on = 11h56 – 2h45 = 09h11 Time it switched on = 09:11 ✓A **OR** 9.11 am **OR** 11 minutes past nine in the morning. **OR** Time = 11:56 ✓RD Subtract 2 hours = 9h56 Subtract 45 minutes = 9h11 ✓M Time it switched on = 09:11 ✓A **OR** 9.11 am **OR** 11 minutes past nine in the morning	1RD reading time 1M subtracting time 1A simplify 09h11 only 2 marks **OR** 1RD reading time 1M subtracting time 1A simplify Full marks if time is read as 11:55 with answer 09:10 or 09.10 a.m. or 10 minutes past nine in the morning (3)	M L1(2) L2(1)
2.3.2	Temperature in °F = (1,8 × 25°) + 32° ✓SF ✓A = 45° + 32° = 77° ✓CA **Accept correct answer only**	1SF substitute 1A simplify 1CA degrees Fahrenheit (3)	M L2
			[26]

QUESTION 3 [25]			
Ques	**Solution**	**Explanation**	**Topic**
3.1.1	✓A ✓A The actual size of the shirt is 18 times bigger in reality than shown on the diagram **OR** ✓A ✓A ***Every unit in the diagram represents 18 units in reality ✓A **OR** ✓A ***Every mm/cm on diagram = 18 mm/cm in reality ✓A **OR** The diagram is $\frac{1}{18}$ of the actual size of shirt. ✓A ✓A **OR** ✓A The diagram is 18 times smaller than the actual shirt.	1A actual size 1A 18 times bigger **OR** 1A unit on diagram 1A 18 units in reality 1A mm/cm diagram 1A 18 mm/cm reality 1A $\mathbf{\frac{1}{18}}$ 1A actual size of shirt 1A 18 times smaller 1A actual size of shirt ***** Both units must be the same (2)	**MP** L1
3.1.2	✓M 486 mm ÷ 18 = 27 mm ✓A **OR** 1 : 18 = **s** : 486 ✓M 18s = 486 $s = \frac{486}{18}$ mm = 27 mm ✓A **Accept correct answer only**	1M dividing by 18 1A scaled length 1M ratio 1A scaled length (2)	**MP** L2
3.1.3	10 buttons (as seen on diagram) ✓✓A **OR** 11 buttons for assuming the collar has a button ✓✓A	2A number of buttons 2A number of buttons (2)	**MP** L1

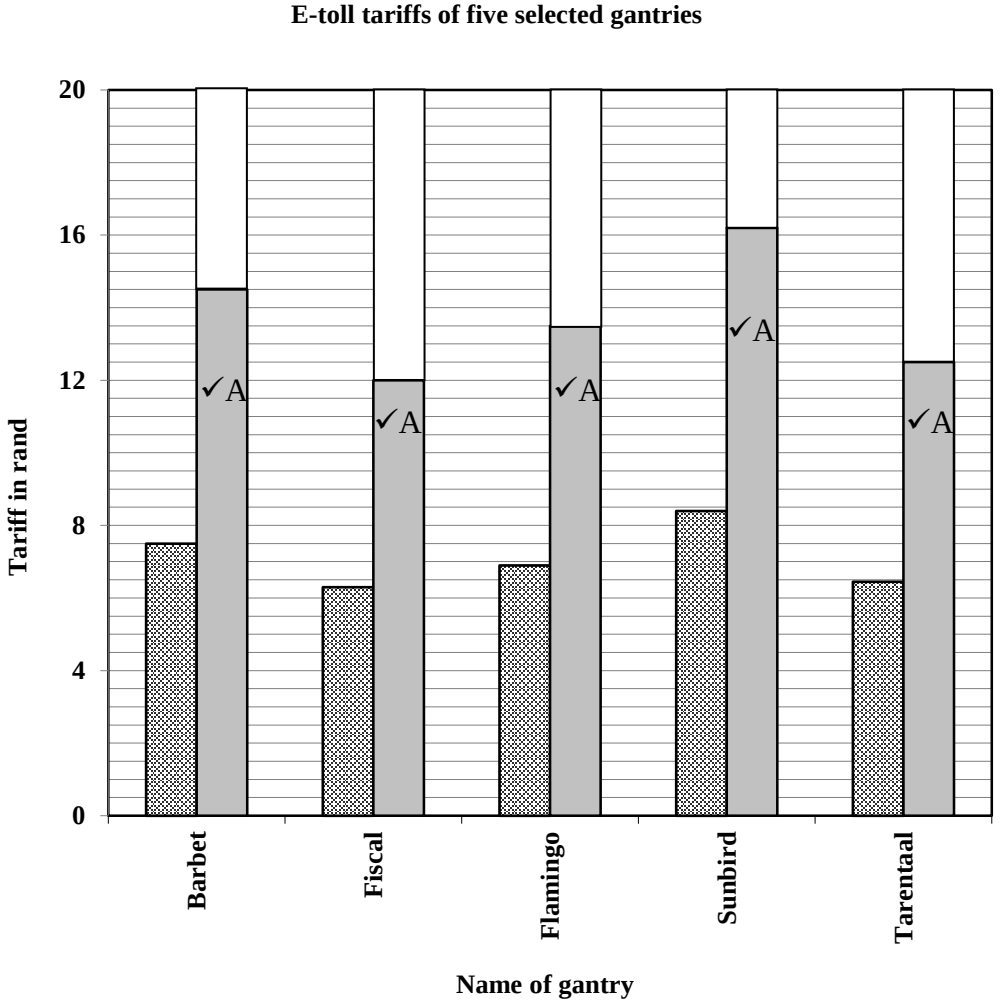
Ques	Solution	Explanation	Topic
3.1.4	Length of strip = 21,5 mm ✓A Actual length = 21,5 mm × 18✓M = 387 mm ✓CA **OR** **Alternative possible measurements:** Accept: 378 mm to 396 mm	1A length in mm 21mm OR 22mm 1M multiplication by 18 1CA simplify (3)	**MP** L1(1) L2(2)
3.1.5	Right hand side ✓✓A	2A interpret diagram (2)	**MP** L1
3.2.1	✓M/A **K** = 60 cm + 90 cm + 60 cm = 210 cm ✓A **Accept correct answer only**	1M/A adding 1A simplify (2)	**MP** L1
3.2.2	✓M/A Maximum number of persons = 9 × 4 = 36 ✓A **Accept correct answer only**	1M/A multiplying 1A no of persons (2)	**MP** L1
3.2.3	✓RD ✓CA ✓M T = 900 cm – 150 cm – (3 × 210 cm) – (2 × 50 cm) = 20 cm ✓CA **OR** ✓CA ✓M ✓M T = (900 – 210 – 50 – 210 –50 –210 – 150) cm = 20 cm ✓CA **OR** ✓M ✓M ✓M T = 900 – (60 × 6) – (90 × 3) – (50 × 2) – 150 = 900 – 880 = 20 cm ✓CA **Accept correct answer only**	1RD length of 900 cm 1 CA tables × 3 1M subtracting values 1CA simplify **OR** 1M length of 210 cm 1M subtracting 1M correct values 1CA length **OR** 1M length of 6 chairs 1M length of 3 tables 1M spaces between tables 1CA simplify (4)	**MP** L2

Ques	Solution	Explanation	Topic
3.2.4	 1A line drawn northern direction (up), passing between 2 pairs of tables 1A line drawn western direction (left) to point Y Does not have to be horizontal or vertical straight lines. Accept any indication of the route. (2)		**MP** L2
3.2.5	South West ✓✓A **Accept exact direction only**	2A compass direction 1 mark for North East Accept SSW or WSW or NNE or ENE (2)	**MP** L1

Ques	Solution	Explanation	Topic
3.2.6	Two tables joined requires 6 chairs Number of tables = $24 \div 6 = $ **4 pairs** ✓M ✓A **OR** 8 **OR** 2 Tables requires 6 chairs Ratio of tables as to chairs = 2 : 6 ✓M = 1 : 3 Number of tables = $24 \div 3 = 8$ ✓A OR $24 \times \frac{2}{6}$ **Accept correct answer only**	1M method 1A number of tables **OR** 1M method (ratio) 1A number of tables (2)	**MP** L1
			[25]

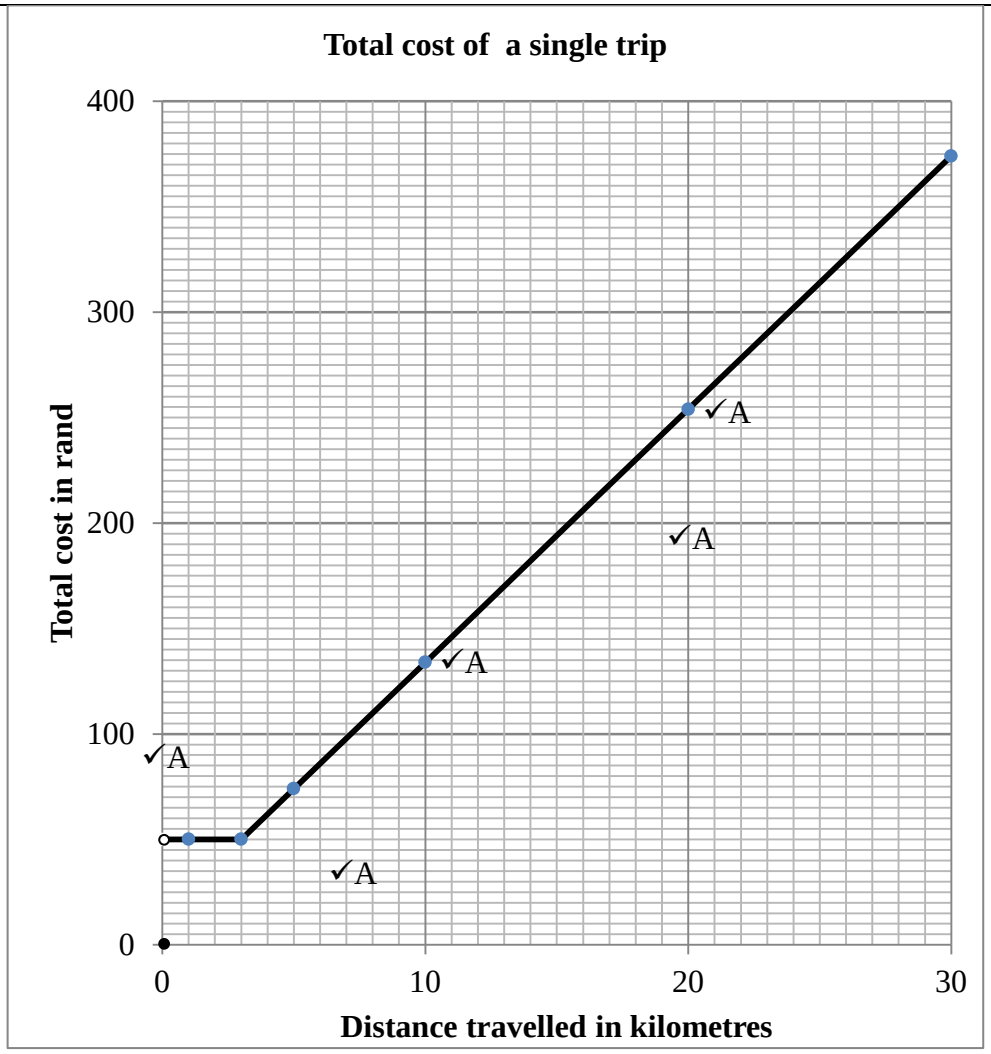
QUESTION 4 [37]			
Ques	**Solution**	**Explanation**	**Topic**
4.1.1	R13,78 ✓✓RD	2 RD Class C cost (2)	**DH** L1
4.1.2	✓A ✓A Ihobhe and Sunbird	1A Ihobhe 1A Sunbird Only 1 mark if two incorrect names added. No mark if more than two names added (2)	**DH** L1
4.1.3 (a)	Mean = $\frac{7,50+7,50+7,28+7,28+6,90+6,90+8,40+8,40+6,45}{17}$ ✓RT $+\frac{6,45+8,03+8,03+7,13+7,13+6,30+6,30+1,50}{17}$ ✓A $=\frac{117,48}{17}$ ✓M = R6,91 ✓CA **Accept correct answer only**	1RT correct values 1A dividing by 17 1M sum of values 1CA mean (4)	**DH** L2
4.1.3 (b)	Ordering: ✓✓M/A 1,50; 6,30; 6,30; 6,45; 6,45; 6,90; 6,90; 7,13; 7,13; 7,28; 7,28; 7,50; 7,50; 8,03; 8,03; 8,40; 8,40 Median = R7,13 ✓CA **Accept correct answer only**	2M/A ordering of values 1CA median (3)	**DH** L2

Ques	Solution	Explanation	Topic
4.1.3 (c)	Median is the better representation ✓A ✓✓J The mean is affected by the R1,50 which is an outlier. **OR** ✓A Both the mean and the median are suitable representations because the difference between them (R0,22) is negligible ✓✓J	1A Identify the correct central tendency (with a possible reason) 2J Correct reason **OR** 1A both mean and median (with a possible reason) 2J Correct reason (3)	**DH** L3
4.1.4	✓RT Difference = R6,50 – R4,87 ✓M/A = R 1,63 ✓CA	1RT reading values from table 1M/A subtraction (one value correct) 1CA difference (3)	**DH** L1
4.1.5	✓M ✓CA 3,21 : 8,03 = 321 : 803 **OR** 1 : 2,5	1M ratio 1CA ratio simplified (2)	**DH** L1
4.1.6	✓M/A Amount saved = R5,63 – R2,91 = R2,72 ✓CA	1M/A subtracting correct values of Pikoko 1CA value (2)	**DH** L1

Ques	Solution	Explanation	Topic
4.1.7	 5A correctly drawing the 5 (five) bars/plotting the points correctly. NB: Sunbird may NOT be drawn on a gridline. MUST be between the 16 and 16,50 line. Max 3 marks if values of other columns are used on condition that all 5 bars are used from the same column of values (5)		**DH** L2
4.2.1	External Loans ✓✓A **OR E** ✓✓A	2A reading data (2)	**DH** L1
4.2.2	✓M ✓CA 100% – (11%+2%+12%+3%+14%) = 58% **OR** 11%+2%+12%+3%+14% = 42% ✓M 100% – 42% = 58%✓CA **Accept correct answer only**	1M sum of all given % 1CA required % **OR** 1M sum of all given % 1CA required % 1 mark if 1 value is omitted (2)	**DH** L1

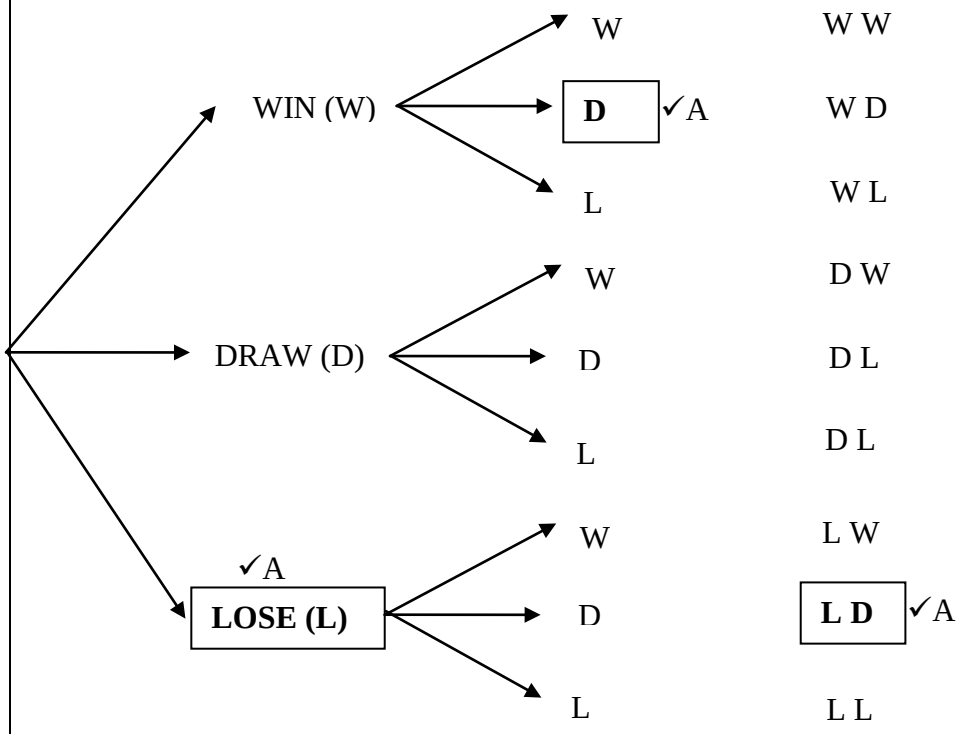
Ques	Solution	Explanation	Topic
4.2.3	Value of External Loans = $\frac{14}{100}$ ✓RG × R587 646 376 ✓M = R82 270 492,64 ✓CA **OR** 100% – 14% = 86% ✓RG Value of External Loans = R587 646 376 – 86% of R587 646 376 ✓M = R82 270 492,64 ✓CA **Accept correct answer only**	1RG correct % 1M multiplying by R587 646 376 1CA loan amount **OR** 1RG correct % 1M subtracting 86 % of amount 1CA loan amount Penalty for incorrect rounding (3)	**DH** L1
4.2.4	Recreation Facilities ✓✓RG **OR L** ✓✓RG	2RG reading data (2)	**DH** L1
4.2.5	Twenty eight **million**, four hundred and one thousand, seven hundred and thirty six rand. ✓A ✓A	1A millions 1A word format of number No penalty for units (2)	**DH** L1
			[37]

QUESTION 5 [24]			
Ques	**Solution**	**Explanation**	**Topic**
5.1.1	✓A ✓A ✓A Cost (R) = 50 + 12 × (number of kilometres – 3) ✓A ✓A **OR** ✓A Cost (R) = 50 + 12 × (number of kilometres) – 36 **OR** ✓✓A ✓A Cost (R) = 14 + 12 × number of kilometres **OR** ✓A ✓A ✓A Cost (R) = 50 + 12 × (k – 3) Where k = number of kilometres **OR** ✓A ✓A ✓A Cost (R) = 14 + 12 × k Where k = number of kilometres	1A R50 call-out fee 1A R12 × no km 1A no. km – 3 **OR** 1A R50 call-out fee 1A R12 × no km 1A no. km – 36 **OR** 2A R14 1A R12 × no. km **OR** 1A 50 call-out fee 1A 12 1A k – 3 (with description of k) **OR** 1A 50 – 36 1A 12 1A k (with description) Max 2 marks if variable is used and explained incorrectly (3)	**F** L2

5.1.2	 1A y-intercept at R50 and *must be an open circle* 1A **horizontal** line from 1 – 3 km; 2A any other 2 points correct 1A **inclined** line passing through correct plotted points (5)	**F** L2

Ques	Solution	Explanation	Topic
5.1.3	✓M/A Cost (without call out fee) = R1 214 – R50 = R 1 164 ✓M Kilometres charged = R1 164 ÷ 12 = 97 km ✓M Distance travelled = 97 + 3 = 100 km ✓A **OR** ✓M/A ✓M ✓M Distance = [(R1 214 – R50) ÷ R12] + 3 km = (R1 164 ÷ R12) + 3 km = 97 km + 3 km = 100 km✓A **OR** If number of kilometeres = ***n*** ✓SF 1 214 = 50 + [12 × (***n*** – 3)] 1 214 = 50 + 12***n*** – 36 12***n*** = 1 214 – 50 + 36 ✓S $n = \frac{1214-50+36}{12}$ ✓M = 100 ✓A **OR** Table used: km: 40, 50, 60, 70, 80, 90, 100 Cost: 494, 614, 734, 854, 974, 1094, 1214 Distance = 100 km ✓✓ ✓✓A **OR** ✓M Distance travelled = $\frac{R1214 - R14}{R12}$ km ✓M = 100 km ✓✓A **Accept correct answer only**	1M/A subtracting R50 1M dividing by 12 1M adding 3 km 1A distance **OR** 1M/A subtract R50 1M divide by R12 1M Adding 3 km 1A distance in km **OR** 1SF substitution 1S simplify 1M dividing by 12 1A distance in km **OR** 4A distance in km **OR** 1M value of 14 1M divide by 12 2A distance (4)	F L2

Ques	Solution	Explanation	Topic
5.1.4	✓M/A ✓M Total taxi fare = R50 + (2 × R12) + R100 + (5 × R12) ✓S ✓S = R50 + R24 + R100 + R60 = R234,00 ✓CA **OR** ✓M Return distance from meeting = 5km × 2 = 10 km ✓A Reading from table : R134 for 10 km ✓RT Taxi fare = R134 + R100 ✓M = R234 ✓CA **OR** ✓M/A ✓M Total taxi fare = 50 + [12 × (10 – 3)] + 100 = 50 + (12 × 7) + 100 ✓M ✓S = 50 + 84 + 100 = R234 ✓CA **OR** Reading from graph ✓M 5km × 2 = 10 km ✓A 10 km cost R134 ✓RG Total taxi fare = R134 + R100 ✓M = R234 ✓CA	1M/A R50 call out fee 1M add R100 1S cost of R24 1S cost of R60 1CA cost of trip **OR** 1M multiply 1A 10 km 1RT R134 1M add R100 1CA cost of trip **OR** 1M/A R50 call out fee 1M subtract 3 km 1M add R100 1S 84 1CA cost of trip **OR** 1M multiply 1A 10 km 1RG R134 1M add R100 1CA cost of trip Max three marks if answer is R174 or R248 (5)	F L1 (2) L2 (3)

Ques	Solution	Explanation	Topic
5.2.1	 **NOTE: Accept answers if written in words.** (3)		**P** L3
5.2.2	C ✓✓A	2A statement (2)	**P** L1
5.2.3	$\frac{5}{9}$ ✓CA ✓CA **OR** ≈55,56%✓✓CA **OR** ≈0,56✓✓CA	1CA numerator 1CA denominator **OR** 2CA in % form **OR** 2CA in decimal form (2)	**P** L3
			[24]

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GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2014

MEMORANDUM

MARKS: 150

Symbol	Explanation
M	Method
M/A	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG	Reading from a table/Reading from a graph
SF	Correct substitution in a formula
O	Opinion/Example
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
NPR	No penalty for rounding

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QUESTION 1 [38 MARKS]			
Ques	**Solution**	**Explanation**	
1.1.1	✓A The data is **discrete**, because the **violent incidents** is counted/whole numbers/integral values /categorised ✓O	1A correct type 1O reason (2)	L4
* 1.1.2	Total number of incidents involving boys = 13 + 12 + 18 + 11 + 10 + 16 = 80 ✓ S Total number of incidents involving girls = 7 + 3 + 4 + 7 + 5 + 19 ✓RG = 45 ✓ CA Difference = 80 – 45 = 35✓ CA **OR** Total for boys and girls = 20+15+22+18+15+35 = 125 ✓ S Total for boys = 13 + 12 + 18 + 11 + 10 + 16 = 80 ✓ S Number of girls = 125 – 80 = 45 ✓ CA Difference = 80 – 45 = 35 ✓ CA **OR** The total of the differences between boys and girls ✓ A ✓ A ✓ A = 6 + 9 + 14 + 4 + 5 – 3 = 35 ✓ CA	1S total number of boys 1RG reading from graph 1CA total number of girls 1CA difference **OR** 1S Total number of boys and girls 1S Total number of boys 1CA number of girls 1CA Difference **OR** 2A Positive differences 1A for negative 3 1CA the differences Max 2 marks if part data used Answer only full marks (4)	L3

*** This question must not be marked in Limpopo. The paper will be marked out of 143 and scaled and then the candidates' total mark will be up-scaled to 150 marks**

Ques	Solution	Explanation	
* 1.1.3	Cyber bullying ✓A Girls avoiding physical violence. ✓✓O **OR** Girls are afraid of confrontation and fighting ✓✓O **OR** ✓✓O Easier to express their emotions/feelings on social media	1A/RG reading from graph 2O explanation (3)	L3(1) L4(2)
1.2.1	Range = Highest value – Lowest value 5 = 18 – A ✓ M **A** = 13 ✓ CA **OR** A = 18 – 5 = 13 ✓M ✓ CA	1M concept of range 1CA value of A **OR** 1M concept of range using 5 1CA value of A Answer only full marks (2)	L2
1.2.2	Mean = $\frac{13+14\times4+15\times5+16\times10+17\times13+18\times7}{40}$ ✓ M ✓ A $=\frac{651}{40}$ ✓ CA = 16,275	**NB: Answer from Q 1.2.1** 1M adding all 40 values 1A dividing by 40 1CA Simplification NPR Answer only full marks (3)	L2

*** This question must not be marked in Limpopo. The paper will be marked out of 143 and scaled and then the candidates' total mark will be up-scaled to 150 marks**

Ques	Solution	Explanation	
1.2.3	**B** = $\frac{15+16}{2}$ ✓A = 15,5 ✓CA **C** = $\frac{16+17}{2}$ ✓M = 16,5 ✓CA **D** = 17 ✓CA	1A identifying the correct values 1 CA value of B [If only B = 15 then one mark and If answer only B=23 then one mark] 1 M concept of median 1 CA value of C 1 CA value of D Answer Only full marks (5)	L2
1.2.4	P = $\frac{30}{40}$ ✓A ✓A = 0,75 ✓CA	1A 30 grade 9 boys 1A no. of boys 40 1CA decimal Answer Only full marks (3)	L2
1.2.5	The grade 9 boys are too old for their grade. ✓✓J **OR** Social: ✓✓J Need recognition / low self- esteem / identity crisis. **OR** Economic: To gain favours from others. ✓✓J **OR** Educational: They are frustrated by their lack of progress. ✓✓J **OR** Environmental factors/ emotional factors ✓✓J **OR** ✓✓J Contextual factors/ No parental control/Peer pressure **OR** ✓✓J Violent community / child headed family/gang related	2J reason (2)	L4

Ques	Solution	Explanation	
1.3.1	Total cost in Rand ✓A ✓A ✓A = 300 for the first 15 passengers + 50 × the number of persons more than 15 ✓A **OR** Total cost (in Rand) ✓A ✓A ✓A ✓A = 300 + (the number of persons – 15) ×50 **OR** Total cost (in Rand) ✓A ✓A ✓A = 300 + (*n* – 15 persons) ×50 ✓A Where *n* is the number of persons more than 15 **OR** Total cost (in Rand) ✓A ✓A = (number of persons)× 50 – 450 ✓✓A	1A constant cost 1A 15 persons 1A number of persons more than 15 1A multiply by the rate R50 **OR** 1A constant cost 1A using 15 persons 1A using a variable with explanation 1A multiply by the rate R50 **OR** 1A constant cost 1A using 15 persons 1A using a variable with explanation 1A multiply by the rate R50 **OR** 2A – 450 1A number of persons 1A multiply by the rate R50 (4)	
1.3.2 (a)	✓SF 900 = 300 + (*n* – 15 persons) ×50 (*n* – 15 persons) ×50 = 600 *n* – 15 persons = 12 *n* = 27 ✓A **OR** 27 ✓✓RT	1SF Substituting in formula 1A Maximum number **OR** 2 RT Max number of passengers [Both 25 and 27 one mark and 25 only, no marks] (2)	L3

Ques	Solution	Explanation	
1.3.2 (b)	10 learners + 1 teacher 10 learners + 1 teacher ✓✓MA 4 learners + 1 teacher ∴ 24 learners and 3 teachers ✓A 24 : 3 ✓CA = 8: 1 ✓CA **OR** 1 educator for 10 learners ✓ MA $\therefore \frac{1}{11} \times 27 = 2{,}454545...$ teachers ✓ CA ∴ 3 teachers ✓ R And 24 learners 24 : 3 ✓ CA 8: 1 ✓ CA	**NB:** Use CA from Q1.3.2(a) 2MA working with ratio 1A Number of teachers 1CA ratio in correct order 1CA simplified ratio **OR** 1MA working with ratio 1CA number of teachers 1R Rounding up 1CA ratio in correct order 1CA simplified ratio (5)	L3
1.3.3	There is only one double six. ✓ A There is 6 combinations of seven. ✓ A ∴ Mr Boitumelo has a larger probability than Miss Ansie to accompany the learners. ✓ O **OR** ✓ A $P_{(\text{double six})} = \frac{1}{36} \approx 2{,}8\%$ $P_{(\text{seven})} = \frac{6}{36} = \frac{1}{6} \approx 16{,}7\%$ ✓ A ∴ Mr Boitumelo has a larger probability than Miss Ansie to accompany the learners. ✓ O	1A probability of double six 1A probability of seven 1O explanation **OR** 1A probability of double six 1A probability of seven 1O explanation (3)	L4
		[38]	

QUESTION 2 [33MARKS]			
Ques	**Solution**	**Explanation**	
2.1.1	Volume of petrol = $\frac{\text{R500}}{\text{R14,04}}$ litre ✓ M = 35,61253561 litre ✓ A <u>Distance each model can travel with 35,613 ℓ of petrol:</u> **Sonic 1.6 :** $\frac{35,613}{6,7} \times 100 \text{ km} \approx 531,54 \text{ km}$ ✓ CA **Aveo 1.6 :** $\frac{35,613}{7,3} \times 100 \text{ km} \approx 487,85 \text{ km}$ ✓ CA ∴ **Sonic 1.6** will travel a greater distance. ✓ ✓O **OR** ✓ M Volume of petrol = $\frac{\text{R500}}{\text{R14,04}/\ell} = 35,613\ \ell$ ✓ A <u>Finding distance using consumption rate for each model:</u> Sonic rate = $\frac{100\,\text{km}}{6,7\ell} = 14,925 \text{ km}/\ell$ Distance = 14,925 km/ℓ × 35,613 ≈ 531,5 km ✓ CA Aveo rate = $\frac{100\,\text{km}}{7,3\ell} = 13,70 \text{ km}/\ell$ Distance = 13,70 km/ℓ × 35,613 ≈ 487,9 km ✓ CA ∴ **Sonic 1.6** will travel a greater distance. ✓ ✓O	1M dividing by R14,04/ ℓ 1A volume 1CA distance 1CA distance 2O conclusion **OR** 1M dividing by R14,04/ ℓ 1A volume 1CA distance 1CA distance 2O conclusion [Correct conclusion only 2 marks] (6)	L3

Ques	Solution	Explanation	
2.1.2	Number of stops and the length of stopping while the engine is running. ✓ O **OR** The driving pattern of the driver for example fast acceleration and hard breaking. ✓ O **OR** ✓ O Driving at high speeds with open windows **OR** Use of the air conditioner. ✓ O **OR** The condition of the car with relation to tyre pressure, load, etc. ✓ O **OR** ✓ O Condition of the road surface, and the slope of the road. ✓ O **OR** Mechanical fault / condition / Electronic damage **OR** Load and number of passengers in vehicle ✓ O **OR** Traffic congestion ✓ O	1O any FIRST correct factor 1O for any SECOND correct factor (2)	L4
2.1.3	**Sonic** Monthly petrol cost (in Rand) ✓M ✓A ✓MA $= \frac{35\,000}{12} \times 14{,}04 \times \frac{6{,}7}{100} = 2\,743{,}65$ ✓CA Total running cost(in Rand) = 2 743,65 + 2 657,00 = 5 400,65 ✓CA **Aveo** Monthly petrol cost (in Rand) $= \frac{35\,000}{12} \times 14{,}04 \times \frac{7{,}3}{100} = 2\,989{,}35$ ✓CA Total running cost(in Rand) = 2 989,35 + 1 942,00 = 4 931,35 ✓CA ∴ **Aveo 1.6** is more economical. ✓ O **OR**	1M dividing by 12 1A multiply petrol price 1MA multiply by consumption rate 1 CA petrol cost Sonic 1CAtotal running cost for the Sonic 1 CA petrol cost Aveo 1CA total running cost for the Aveo 1O conclusion [3 out of 8 marks if petrol cost ignored]	

Ques	Solution	Explanation	
2.1.3 Cont.	**Sonic 1.6** Instalment cost per year = 12 × R 2 657 ✓M = R 31 884 Petrol cost per year = 35 000 km $\times \frac{6{,}7\ell}{100\,\text{km}}$ × R14,04/ ℓ ✓MA ✓A = 2 345 × R14,04 = R 32 923,80 ✓CA Total running cost for the year = monthly instalments for 12 months + petrol cost per year = R 31 884 + R 32 923,80 =R 64 807,80 ✓CA **Aveo 1.6** Instalment cost per year = 12 × R 1 942 = R 23 304 Petrol cost per year = 35 000 km $\times \frac{7{,}3\ell}{100\,\text{km}}$ × R14,04/ ℓ = 2 555 × R14,04 = R 35 872,20 ✓CA Total running cost per year = monthly instalments for 12 months + petrol cost per year = R 23 304 + R 35 871,20 =R 59 176,20 ✓CA The Aveo 1.6 is more economical. ✓O	1M multiplying by 12 1MA multiply by consumption rate 1A multiply petrol price 1CA petrol cost Sonic 1CA total running cost for the Sonic 1 CA petrol cost Aveo 1CA total running cost for the Aveo 1O conclusion	L4
	✓MA **OR** R14,04 / ℓ × 6,7 = R94,068 ✓A Sonic: R94,068 : 100 x : 35 000 ∴ x = R32 923,80 ✓CA Total running cost = R32 923,80 + 12 × R2 657 ✓M = R64 807,80 ✓CA Aveo : R14,04 / ℓ × 7,3 = R102,492 R102,492 : 100 y : 35 000 ∴ y = R35 872,20 ✓CA Total running cost = R35 872,2 + 12 × R1 942 = R59 176,20 ✓CA ∴ Aveo 1.6 is more economical. ✓O	**OR** 1MA multiply by consumption rate 1A multiply petrol price 1 CA petrol cost Sonic 1M multiplying by 12 1CAtotal running cost for the Sonic 1 CA petrol cost Aveo 1CA total running cost for the Aveo 1O conclusion (8)	

Ques	Solution	Explanation	
2.2.1	Age 6 to 7 years. ✓✓ RG	2RG the age [6 or 7 one mark] [Including other intersection points **ONLY** one mark] (2)	L2
2.2.2	Growth is a continuous phenomenon. ✓ O **OR** Growth is affected by many factors like nutrition and health. ✓ O **OR** ✓ O It is influenced by genetic makeup inherited from parents. **OR** This graph is for average heights. ✓ O **OR** Physical disabilities will influence height ✓ O	1O any FIRST correct reason 1O for any SECOND correct reason (2)	L4
2.2.3	Between 4 and 6 years ✓RG Between 11 and 14 years ✓RG	1RG reading from graph 1RG reading from graph [5 and 13 only one mark] (2)	L2
2.2.4	**Boys stay longer** than girls in childhood. ✓✓RG **Both** girls and boys **remain the same** in pre-adolescence. ✓RG **Girls stay longer** in adolescence. ✓✓RG **OR**	2RG comparing childhood stage 1RG comparing pre-adolescence 2RG comparing adolescence **OR**	L4

Ques	Solution	Explanation	
2.2.4 Cont.	**Childhood** Girls stay in childhood stage: 7 years ✓✓RG Boys stay in childhood stage: 9 years **Pre-adolescence** Girls stay in pre-adolescent stage: 2 years Boys stay in pre-adolescent stage: 2 years ✓RG **Adolescence** Girls stay in adolescent stage: 6 years Boys stay in adolescent stage: 4 years ✓✓RG	2RG number of years in childhood 1RG number of years in pre-adolescence 2RG number of years in adolescence (5)	
2.2.5	The girls' height slows down/stabilizes/levels/evens out. ✓✓O **OR** ✓✓O The girls' growth rate relating to height decreases.	2O trend **[0 marks or 2 marks]** **[Trend relating to girls only]** (2)	L4
2.2.6	Height in inches = 165 × 0,3937 ✓C = 64,9605 ✓ A ✓✓ CA The boy's height is **above the average height** for boys **OR** Height in cm $= \frac{63}{0,3937}$ ✓C = 160,02 ✓ A ✓✓ CA The boy's height is **above the average height** for boys	1C conversion 1A accuracy 2CA conclusion [Range 62 to 65] **OR** 1C conversion 1A accuracy 2CA conclusion [Range 157 to 165] (4)	L3
		[33]	

QUESTION 3 [34 MARKS]			
Ques	**Solution**	**Explanation**	
3.1.1	**Note: Afrikaans scripts to be marked differently** Annual salary = R 20 416,67 × 12 = R 245 000,04 ✓ MA Pension = R 245 000,04 × 6 % = R 14 700 ,00 ✓ CA Taxable amount without bonus = R 245 000,04 – R 14 700,00 = R 230 300, 04 ✓ CA Taxable annual income ✓ CA = R230 300,04 + R20 416,67 = R250 716,71 **OR** Monthly pension = R20 416,67 × 6% = R1 225 ✓ MA Monthly taxable salary = R20 416,67 – R1 225 = R19 191,67 ✓ CA ✓ MA Annual taxable income = R19 191,67 × 12 + R20 416,67 = R250 716,71 ✓ CA **OR** Annual taxable income ✓ MA ✓ MA = (13 × R 20 416,67) – (12 × R 20 416,67 × 6%) = R 265 416,71 – R14 700 ✓ CA = R250 716,71 ✓ CA	1MA annual salary 1CA pension 1CA subtracting the pension 1 CA taxable annual income **OR** 1MA pension 1CA subtracting the pension 1MA annual salary 1 CA taxable annual income **OR** 1MA multiplying by 13 1MA calculating the pension 1CA subtracting the pension 1 CA taxable annual income [Pension omitted lose 2 marks] [Bonus omitted lose 1 mark] (4)	L3
3.1.2	✓ A ✓ SF Rate of tax = R 29 808 + 25% × (R250 716,71 – R 165 600) = R 29 808 + R 85 116,71 × 25% = R 29 808 + R 21 279,18 = R 51 087,18 ✓ CA ✓ S Annual tax after rebate = R 51 087,18 – R 12 080,00 = R 39 007,18 ✓ CA	NB: Amount from Q3.1.1 1A for correct tax bracket 1SF for substituting into the formula 1S simplification 1CA for tax amount 1CA for tax amount after rebate NPR (5)	L3

Ques	Solution	Explanation	
3.1.3	✓ CA Monthly Tax = R 39 007,18 ÷ 12 = R 3 250,60 Net monthly salary = Monthly salary – pension – monthly tax ✓ M = R 20 416,67 – R 1 225 – R 3 250,60 = R 15 941,07 ✓ CA **OR** Annual salary after tax = Annual salary – pension – annual tax ✓ M = R245 000,04 – R 14 700,00 – 39 007,18 = R 191 292,86 ✓ CA ∴ Net monthly salary = $\frac{R191292,86}{12}$ = R15 941 ,07 ✓ CA	1CA for tax value per month 1M for subtracting both values 1CA net salary [CA only if a monthly salary is used] **OR** 1M for subtracting both values 1CA annual salary 1CA monthly salary [dividing by 12] (3)	L3
3.2.1	Amount if inflation rate was used for increase ✓ A ✓ M = R44,8 billion × 105,77% = R47,38496 billion ✓ CA ✓ M This amount is less than the amount which was allocated, therefore her claim was valid. ✓ O **OR** Amount if inflation rate was used for increase ✓ A ✓ M = R44 800 000 000 × 105,77% = R47 384 960 000 ✓ CA ✓ M This amount is less than the amount which was allocated, therefore her claim was valid. ✓ O **OR**	1A correct amount from table 1M percentage increase 1CA increased amount 1M comparing 1O stating that she is correct **OR** 1A correct amount from table 1M percentage increase 1CA increased amount 1M comparing 1O stating that she is correct **OR**	L3(4) L4(1)

Ques	Solution	Explanation	
3.2.1 Cont.	Difference = R47,9 billion – R44,8 billion ✓ A = R3,1 billion ✓ M Percentage increase $= \frac{\text{R3,1 billion}}{\text{R44,8 billion}} \times 100\%$ ✓ MA = 6,919642857 % ≈ 6,9% ✓ CA Her claim is valid. ✓ O **Note** [Word billion must be there when subtracting and not for %]	1A correct amount from table 1M subtracting correct values 1MA calculating the percentage increase 1CA for rounding off 1O stating that she is correct (5)	
3.2.2	Department of National Defence percentage growth from 2013/14 to 2014/15 is 6,9% ✓ CA South African national budget percentage growth from 2013/14 to 2014/15 ✓ M/A $= \frac{\text{R1,25 trillion} - \text{R1,15 trillion}}{\text{R1,15 trillion}} \times 100\%$ ✓M = 8,69565174 % ✓ CA Dr Khoza's statement **is correct**.✓O	* CA from Q3.2.1 1CA correct percentage 1M/A using correct values 1M calculating growth 1CA calculating average % 1O Stating that the increase is greater (5)	L3(3) L4(2)
3.2.3	Amount 2013/14 = 8,1% × R 41,6 billion + R41,6 billion ✓ M = R3,3639 billion + 41,6 billion = R44,9696 billion ✓ CA Amount 2014/15 = 5,9% × R 44,9696 billion + R44,9696 billion = R2,6532064 billion + 44,9696 billion ✓ M = R 47,6228064 billion ✓ CA **OR** ✓ M ✓ CA Actual amount = R 41,6 billion × 108,1% = R 44,9696 billion ✓ M ✓ CA R 44,969 6 billion × 105,9% = R 47,622 806 4 billion or R47 622 806 400	1M for increasing by 8,1% 1CA the amount 1M for increasing by 5,9% 1CA the amount **OR** 1M for increasing by 8,1% 1CA the amount 1M for increasing by 5,9% 1CA the amount NPR [Penalty 1 mark if billions omitted] (4)	L3

Ques	Solution	Explanation	
3.2.4	Difference =R48 billion - R47,9 billion = R 0,1 billion. ✓ O In reality the difference is not 0,1 but an amount of R100 000 000 (one hundred million) ✓ O **Example:** R 47,9 billion rounded R48 billion implies that there will be an over allocation of R100 million ✓ O	1O for identifying the difference of 0,1 1O For knowing that 0,1 billion is 100 000 000 1O suitable example must be chosen (3)	L4
3.3.1	A visual representation is more understandable (make sense of) for the general public than a table with values only. ✓✓ O **OR** A visual representation is easier to read than text or table consisting of values. ✓✓ O **OR** The actual values are in billions and trillions which many people don't understand, where in these graphs percentages are used which are more understandable. ✓✓ O	2O reason (2)	L4
3.3.2	✓ O A bar graph (multiple/compound) is more appropriate to display this data The bar graph will allow for a much more-in-depth analysis of the ✓✓ O trends in the collection of tax between the different categories over a period of time. **OR** Line or broken line graph ✓ O The two lines will allow for a much more-in-depth analysis of the trends in the collection of tax between the different categories over a period of time. ✓✓ O	1O identifying the type of graph 2O for explaining the advantage of a bar graph **OR** 1O identifying the type of graph 2O for explaining the advantage of a broken line graph (3)	L4
		[34]	

QUESTION 4 [45 marks]			
Ques	**Solution**	**Explanation**	
4.1.1(a)	✓A ✓A ✓CA M15 and M16	1A correct row number 1A seat number 1CA second seat number [15 and 16 two marks] (3)	L2
4.1.1(b)	✓A ✓A 24 × 2 = 48 seats	1A 24 seats 1A total number of seats (2)	L2
4.1.1(c)	✓RT ✓MA ✓RT Total income in OR = (72×78) + (388 × 48) +(83 × 42) + (81 × 28) + (112 × 15) + (82 × 10) ✓S ✓RT = 5 616 +18 624 + 3 486 +2 268 +1 680 + 820 = 32 494 ✓CA	* seats from Q 4.1.1 (b) 1MA adding the values 1RT cost zone A and B 1RT cost for zone C and D 1RT cost for zone E and F 1S simplification 1CA answer [One mark for every 2 zones] (6)	L3
4.1.2(a)	Cost for 1 zone B ticket = 48 OR ✓A = R27, 2183 × 48 = R 1 306,48 ✓C Cost in Euro for one flight ticket = 492, 29 Cost in OR for one flight ticket = $\frac{492,29}{1,87126}$ ✓M = 263,08 Cost in Rand for one flight ticket = 263,08 × R 27, 2183 ✓M = 7 160, 59 ✓CA Total cost per person = R 1 306,48 + R 7 160, 59 = R 8 467,07 ✓CA Total cost for two = R 8 467,07 × 2 = R 16 934,14 ✓CA **OR**	1A cost of ticket 1C convert OR to Rand 1M convert Euro to OR 1M convert OR to Rand 1CA cost of one ticket 1CA calculating total cost per person 1CA calculating total cost for two people **OR**	L4

Ques	Solution	Explanation	
4.1.2(a) (cont.)	Cost for 2 zone B tickets = 2 × 48 OR ✓A = 96 OR = R27, 2183 × 96 = R2 612, 96 ✓C Cost for 2 flight tickets = 2 × €492, 29 = €984, 58 ✓A €984, 58 = $\frac{R27,2183 \times 984,58}{1,87126}$ ✓✓M = R14 321, 15 ✓CA Total cost = R2 612, 96 + R14 321, 15 = R16 934, 11 ✓CA **OR** Cost for Zone B tickets: 2 × 48 OR = 96 OR ✓A ✓A Flight tickets in OR = $\frac{2 \times 492,29}{1,87126}$ ✓C = 526,1588448 ✓CA Total cost: 526,1588448 + 96 = 622,1588448 ✓CA Cost in Rand = 622,1588448 × 27,2183 ✓C = 16 934,11 ✓CA	1A cost for one ticket 1C conversion 1A 2 flight tickets 2M convert Euro to rand 1CA cost of 2 tickets in rand 1CA total cost **OR** 1A cost for one ticket 1A cost of 2 tickets 1C conversion to OR 1CA ticket price 1CA total cost 1C convert OR to Rand 1CA cost in rand (7)	
4.1.2(b)	Time leaving Johannesburg + flight time = 20h30 +11h25 = 31h55 ✓A ✓CA Time in South Africa when they arrived: 07:55 or 7.55 am or five minutes to eight in the morning	1A adding 1CA correct time [If written as 07h55 one mark only] Answer only full marks (2)	L2
4.2.1	South westerly (SW) ✓✓A **OR** South, south westerly (SSW)	2A correct direction (2)	L2

Ques	Solution	Explanation	
4.2.2	This chart only shows distances from Muscat. ✓✓O OR ✓✓O They don't lie in the same direction. ✓✓O OR This is not a map / strip chart.	2O opinion (2)	L4
4.2.3	Muscat to Sydney ≈ 3 349km × 3,5 ✓RT ✓M ≈ 10 716,8 to 11 721, 5km ✓CA	1RT correct value 1M multiplication by 3 349 1CA correct distance [Range of values 3,2 to 3,5] [3 or 4 then max 2 marks] (3)	L2
4.3.1	TSA = P × H + K ✓A ✓SF = 8 × 110 mm × 250 mm + 58 423 mm^2 = 220 000 mm^2 + 58 423 mm^2 = 278 423mm^2 ✓S = 0,278 423 m^2 ✓C For 0,07 m^2 one needs 100mℓ of paint ∴ 1 m^2 one need $\frac{100}{0,07}$ mℓ ✓M = 1 428,57 mℓ ∴ 0,278423 m^2 need = 1428,571429 × 0,278423 = 397,7471429 mℓ ≈ 397,75 mℓ ✓CA Two coats = 2 × 397, 75mℓ = 795, 49 mℓ ✓CA Number of spray cans = $\frac{795,49\,m\ell}{250\,m\ell}$ = 3,18184 ≈4 ✓CA	1A total area of panels 1SF substitution in formula 1S simplification 1C conversion to m^2 1M Method 1CA paint needed for 1 coat 1CA paint needed for 2 coats 1CA rounding up	L4

4.3.1 Cont.	**OR** TSA = P × H + K ✓A ✓C ✓SF = 8 × 0,110 m× 0,250m + 0,058 423 m^2 = 0,22 m^2+ 0,058 423 m^2 = 0,278 423 m^2 ✓S For 0,07 m^2 one needs 100mℓ of paint ∴ 1 m^2 one need $\frac{100}{0,07}$ mℓ ✓M = 1 428,57 mℓ ∴ 0,278423 m^2 need = 1428,571429 × 0,278423 = 397,7471429 mℓ ≈ 397,75 mℓ ✓CA Two coats = 2 × 397, 75mℓ = 795, 49 mℓ ✓CA Number of spray cans = $\frac{795,49\,m\ell}{250\,m\ell}$ = 3,1819 ≈4 ✓CA **OR** TSA = P × H + K ✓A ✓C ✓SF = 8 × 0,110 m× 0,250m + 0,058 423 m^2 = 0,22 m^2+ 0,058 423 m^2 = 0,278 423 m^2 ✓S ✓A 1 spray can covers = 0,07 × 2,5m^2 = 0,175 ✓CA Number of cans = $\frac{0,2784823}{0,175}$ ×2 ✓M = 3,1819 ≈4 ✓CA	**OR** 1A total area of panels 1C conversion to m^2 1SF substitution in formula 1S simplification 1M method 1CA paint needed for 1 coat 1CA paint needed for 2 coats 1CA rounding up **OR** 1A total area of panels 1C conversion to m^2 1SF substitution in formula 1S simplifying 1A spray rate per can 1CA simplification 1M for two coats 1CA rounding up	L4

Ques	Solution	Explanation	
4.3.1 cont.	**OR** TSA = P × H + K ✓A ✓SF = 8 × 110mm × 250mm + 0,058423m^2 = 8 × 0,11m × 0, 25m + 0,05423m^2 ✓C = 0,22 m^2 + 0,058423m^2 = 0,278423m^2 ✓S 100 m*l* covers 0,07 m^2 $\therefore$ 0,28m^2 will need = $\frac{100\times 0,278423}{0,07}$mℓ ✓M = 397,7471429mℓ = 397,75mℓ ✓CA Two coats = 2 × 397, 75mℓ = 795, 49 mℓ ✓CA Number of spray cans = $\frac{795,49\,\text{m}\ell}{250\,\text{m}\ell}=3,181\approx 4$ ✓CA	**OR** 1A total area of panels 1SF substitution in formula 1C conversion to m^2 1S simplification 1M method 1CA paint needed for 1 coat 1CA paint needed for 2 coats 1CA rounding up (8)	
4.3.2	✓MA Height = 240 mm × 164 = 39 360 mm ✓CA = 39, 36 meters ✓C $\therefore$ The height of the actual tower is approximately 39, 4m **OR** ✓MA ✓C Height = 25cm – 1cm = 24 cm = 0,24 m Actual height = 0,24 × 164 = 39,36 m ✓CA	1MA correct height 1CA correct answer in mm 1C conversion **OR** 1MA correct height 1C conversion 1CA correct answer in m **NPR** (3)	L2
4.4	✓A 1. **Mount** the vertical poles to the kick base and **fasten** with the screws. ✓A ✓A 2. **Slide** the three glass panels into the vertical poles. ✓A 3. **Place** the top aluminium frame on top and **fasten** with screws. ✓A ✓A 4. **Screw** the interior standards onto the aluminium framing and **insert** the brackets. ✓A	1A for the vertical poles 1A for the screws 1A glass panels 1A for the top frame 1A Screws 1A interior standards 1A brackets [Single word answers not acceptable.] (7)	L2
		[45]	

TOTAL: 150

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basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2014

MARKS: 150

TIME: 3 hours

This question paper consists of 14 pages and 4 annexures.

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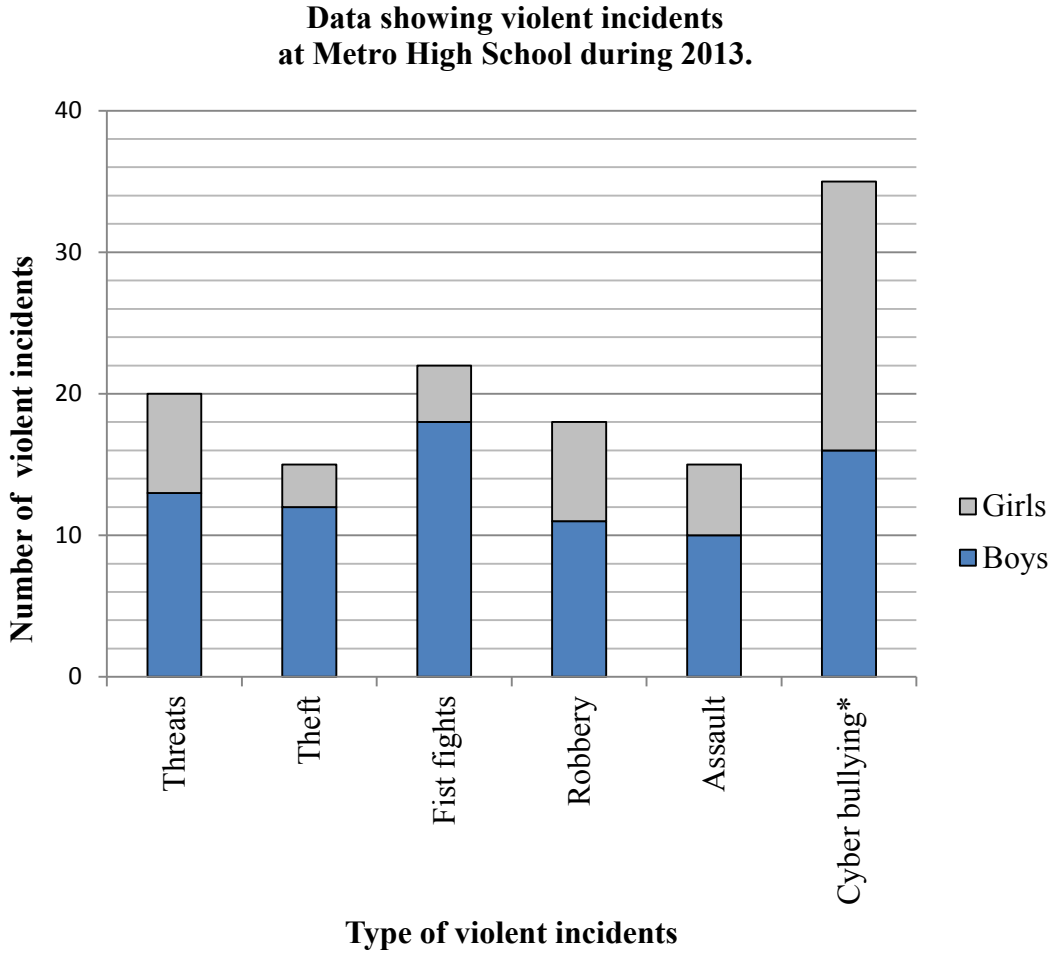
INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Use ANNEXURE A and ANNEXURE B to answer QUESTION 1.3 and use ANNEXURE C and ANNEXURE D to answer QUESTION 4.1.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

QUESTION 1

1.1 Violent incidents in South African schools are a national concern. Young persons are as much at risk of being victims of violence at school as they are outside the school.

The stacked bar graph below shows the recorded data of the number of times boys and girls committed certain types of violent acts at Metro High School during 2013.



* ***Cyber bullying*** *is the use of social media like SMS, BBM, WhatsApp, Facebook, Twitter, et cetera on cellphones, tablets or computers to deliberately harass, threaten or intimidate another person.*

[Adapted from the South African School Administration and Management System]

1.1.1 Explain, with justification, whether the given data is discrete or continuous. (2)

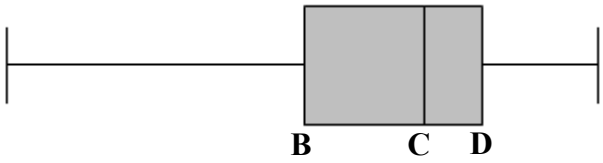
1.1.2 Determine how many more boys than girls were involved in violent incidents at Metro High School during 2013. (4)

1.1.3 Determine the modal violent incident committed by girls at Metro High School during 2013. Explain why this type of incident is the modal violent incident committed by girls. (3)

1.2 The majority of Metro High Schools' learners who committed violent incidents were Grade 9 boys.

The arranged ages of these Grade 9 boys and a corresponding box-and-whisker plot are given below.

A	14	14	14	14	15	15	15
15	15	16	16	16	16	16	16
16	16	16	16	17	17	17	17
17	17	17	17	17	17	17	17
17	18	18	18	18	18	18	18



[Adapted from the South African School Administration and Management System]

1.2.1 Determine the missing value **A** if the range of the ages of the Grade 9 boys who committed violent incidents is 5 years. (2)

1.2.2 Calculate the mean age of the Grade 9 boys who committed violent incidents. (3)

1.2.3 Calculate the missing quartile values **B**, **C** and **D** of the box-and-whisker plot. (5)

1.2.4 A Grade 9 boy who committed a violent act is randomly selected. Determine the probability (expressed in decimal form) that the boy would be 16 years or older. (3)

1.2.5 Give a possible reason why so many Grade 9 boys at Metro High School committed violent incidents. (2)

1.3 The Department of Correctional Services became aware of the problem that Metro High School was experiencing with violent incidents at the school. They invited the school to visit one of their prisons on condition that one teacher had to accompany every group of 10 learners or fewer.

Mr Palm, the principal, must hire a bus to take the learners and teachers to visit the prison.

Graphs representing the total cost of hiring buses from two different transport companies are drawn on ANNEXURE A.

1.3.1 The total cost for hiring a bus from Company P is calculated by using the following formula:

Total cost (in rand) = number of passengers × 35

Use the graphs on ANNEXURE A and write down a formula for calculating the total cost (in rand) for Company Q in the form:

Total cost (in rand) = ... (4)

1.3.2 Mr Palm has budgeted R900 for the total cost of the bus transport. Use the graphs on ANNEXURE A or the formulas in QUESTION 1.3.1 to determine the following:

(a) The maximum number of passengers that can be transported. (2)

(b) The ratio of learners to teachers, if the maximum number of passengers is transported according to the condition set out by Correctional Services regarding the number of teachers. (5)

1.3.3 Two of the teachers decided to play a game with two unbiased dice to determine who will accompany the learners on the trip.

Miss Ansie says she will go if the two rolled dice show a double six. Mr Boitumelo says he will go if the two rolled dice show a sum of seven.

The possible outcomes of rolling two unbiased dice are shown on ANNEXURE B.

Explain, with calculations, why it is more likely that Mr Boitumelo rather than Miss Ansie will accompany the learners. (3)

[38]

QUESTION 2

2.1 Daya, a health worker, needs to purchase a car to travel to work. She sees advertisements for two models, a Sonic 1.6 and an Aveo 1.6.

Both cars need the same percentage deposit and have a full maintenance plan. The running costs for the first year will only be the monthly instalments and petrol costs.

TABLE 1 below shows the monthly instalment and average petrol consumption for the two models.

TABLE 1: Monthly instalment and petrol consumption of the two models

MODEL	MONTHLY INSTALMENT	AVERAGE PETROL CONSUMPTION
Sonic 1.6	R2 657	6,7 litres per 100 km
Aveo 1.6	R1 942	7,3 litres per 100 km

The petrol price was R14,04 per litre on 16 May 2014.

[Source: *Daily News*, Friday 16 May and www.chevrolet.co.za]

2.1.1 State, showing calculations, which model will cover a greater distance using R500 worth of petrol.

NOTE: All other conditions for both models will be identical. (6)

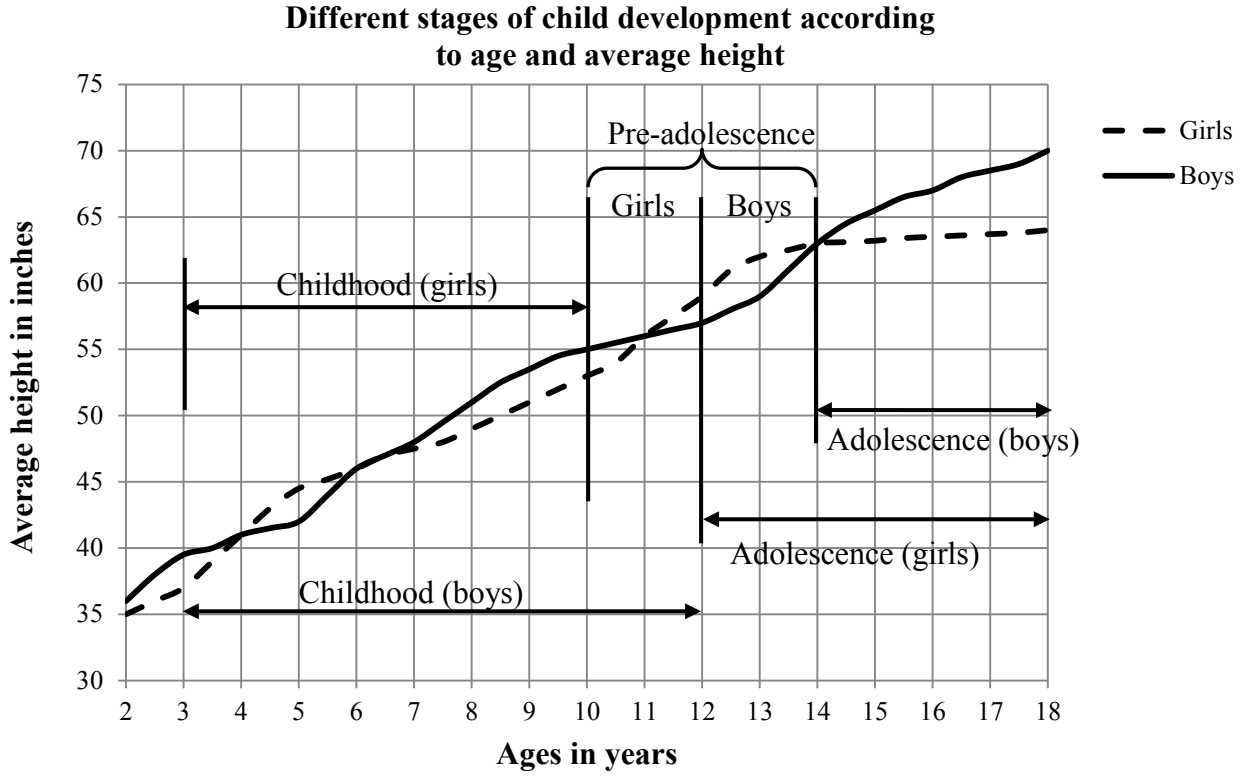
2.1.2 State TWO other factors, besides petrol consumption, that could influence the distance travelled by a car using a full tank of petrol. (2)

2.1.3 Daya estimates that she will travel a total distance of 35 000 km during the first year.

Show, with calculations, which one of the models would be more economical for her to use for the first year. (8)

2.2 Daya is interested in the different stages of child development, namely childhood, pre-adolescence and adolescence.

The graph below shows the different stages of child development according to age and average height.



[Source: www.WHO/growthcharts]

2.2.1 In which age group will both boys and girls have approximately the same average height for nearly a whole year? (2)

2.2.2 Give TWO possible reasons why it cannot be said with certainty that a 10-year-old boy will be 55 inches tall. (2)

2.2.3 Identify the different age groups where the average height of girls is more than that of boys. (2)

2.2.4 A colleague of Daya made the following statement: 'All the stages of child development for boys are longer than those for girls.'

Give a detailed motivation why this statement is NOT correct. (5)

2.2.5 Describe a possible trend for the average height of girls who are 14 years and older. (2)

2.2.6 Daya's 14-year-old son is 165 cm tall. Show by calculation whether he is above or below the average height for his age.

NOTE: 1 cm = 0,3937 inches (4)

[33]

QUESTION 3

3.1 Mr Fortune is a 40-year-old male who receives a basic monthly salary of R20 416,67 and an annual bonus equal to his basic monthly salary. His gross annual income for the 2013/2014 tax year is made up of his basic monthly salary and annual bonus.

He contributes 6% of his basic monthly salary towards his pension fund, but no pension contribution is deducted from his annual bonus.

The following table showing the annual income tax deductions for individuals and special trusts for the 2013/2014 tax year is used by Mr Fortune to calculate his income tax payable to SARS.

TABLE 2: Annual income tax deductions for individuals and special trusts

2013/2014	
INCOME TAX: INDIVIDUALS AND SPECIAL TRUSTS	
Tax rates (year of assessment ending 28 February 2014)	
Individuals and special trusts	
Taxable income (R)	**Rate of tax (R)**
0–165 600	18% of taxable income
165 601–258750	29 808 + 25% of taxable income above 165 600
258 751–358 110	53 096 + 30% of taxable income above 258 750
358 111–500 940	82 904 + 35% of taxable income above 358 110
500 941–638 600	132 894 + 38% of taxable income above 500 940
638 601 and above	185 205 + 40% of taxable income above 638 600
Tax rebates	
Primary	R12 080
Secondary (Persons 65 year and older)	R6 750
Tertiary (Persons 75 year and older)	R2 250

NOTE:

1. Annual income tax is calculated on income after the total pension contributions have been deducted.

2. Income tax payable on annual bonus amounts is spread equally over 12 months.

[Source: www.sars.gov.za]

3.1.1 Calculate Mr Fortune's gross annual taxable income. (4)

3.1.2 Use the annual income tax table above to calculate his annual income tax payable for the year ending 28 February 2014. (5)

3.1.3 Hence, calculate Mr Fortune's net monthly salary if only income tax and pension deductions are considered. (3)

3.2 Dr Khoza, a representative of the South African National Defence Force, wants to compare the amount budgeted for defence in relation to the total national budget.

TABLE 3 below compares the amount budgeted for the 2012/13 to 2014/15 financial years for defence with the total national budget for the same years.

TABLE 3: The amounts budgeted for defence and the total national budget

Financial year	Amount budgeted for defence in billion rand	Total national budget in trillion rand
2012/13	41,6	1,06
2013/14	44,8	1,15
2014/15	47,9	1,25

The annual inflation rate for 2013 was 5,77%.

NOTE: 1 trillion = 1 000 billion

[Source: www.treasury.gov.za and www.inflation.eu/inflation-rates/cpi-inflation-2013.aspx]

3.2.1 Dr Khoza claimed that her department's percentage budget increase for the 2014/15 financial year exceeded the annual inflation rate for 2013.

Show by calculation whether her claim is valid. (5)

3.2.2 Dr Khoza also compared the percentage growth for her department's budget with the percentage growth of the total national budget from 2013/14 to 2014/15. She stated that the defence budget is not increasing at the same annual rate as the national budget.

Verify, by calculation, whether statement is correct. (5)

3.2.3 The percentage growth figures published with each year's budget are as follows:

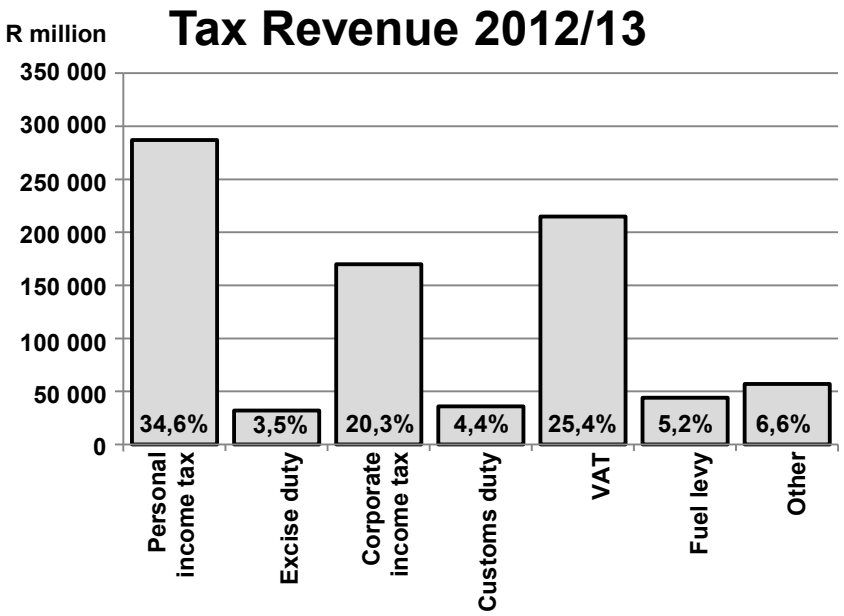
- 2013/14: up by 8,1%
- 2014/15: up by 5,9%

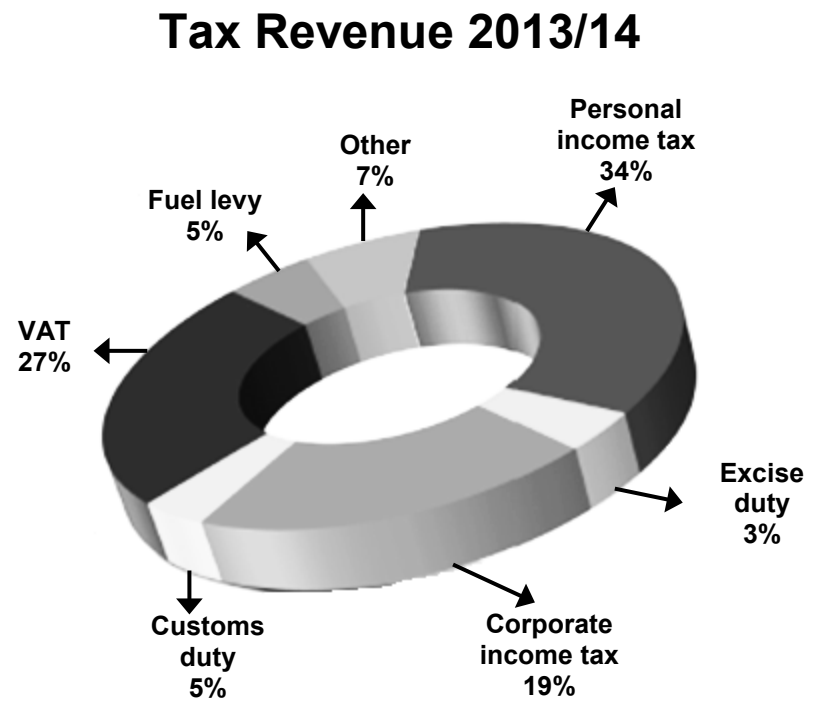
Calculate the actual amount allocated for the 2014/15 financial year using the budgeted amount of R41,6 billion and the percentage growth figures as given above. (4)

3.2.4 If the amount R47,9 billion is rounded off to the nearest billion, it becomes R48 billion.

Give a reason, with an example, to show why rounding off to the nearest billion will influence the budget allocation. (3)

3.3 The graphs below shows the tax collected in different tax categories in South Africa over two financial years.





[Source: www.treasury.gov.za]

3.3.1 Why do you think graphical representations were used to show the data of tax collected? (2)

3.3.2 Explain which type of graphical representation would be most suitable to represent the general trend in tax collection showing the different tax categories over a two-year period. (3)

[34]

QUESTION 4

4.1 Jackie and her friend plan to attend an opera performance at the Royal Opera House in Muscat, the capital of Oman. She will pay the total cost of the trip for both of them. The currency of Oman is the Omani rial (OR).

The opera house in Muscat has four levels of seating. ANNEXURE C shows the layout of the seats of Level 0 only. Each level has different seating zones. The price for each zone for opera performances is summarised in the table below.

TABLE 4: Prices for opera performances

Zones	Number of seats per level				Price per ticket in OR
	Level 0	Level 1	Level 2	Level 3	
A		72			**78**
B	380		8		**48**
C	**X**	12	23		**42**
D			81		**28**
E			34	78	**15**
F			8	74	**10**

[Adapted from www.rohMuscat.org.om/book-now/pricing-seat-plans]

Use ANNEXURE C and the information in TABLE 4 to answer the following questions.

4.1.1 All the seats of the Opera House, except for two seats in Zone B of Level 0, were sold out for one of the opera performances. These available seats are located in the fifth row from the stage and are exactly in the middle of the row. Jackie decided to book these two available seats.

(a) Identify the seat numbers of the seats that Jackie booked. (3)

(b) Determine the missing value **X**. (2)

(c) Calculate the total income, in Omani rial, from ticket sales for this performance. (6)

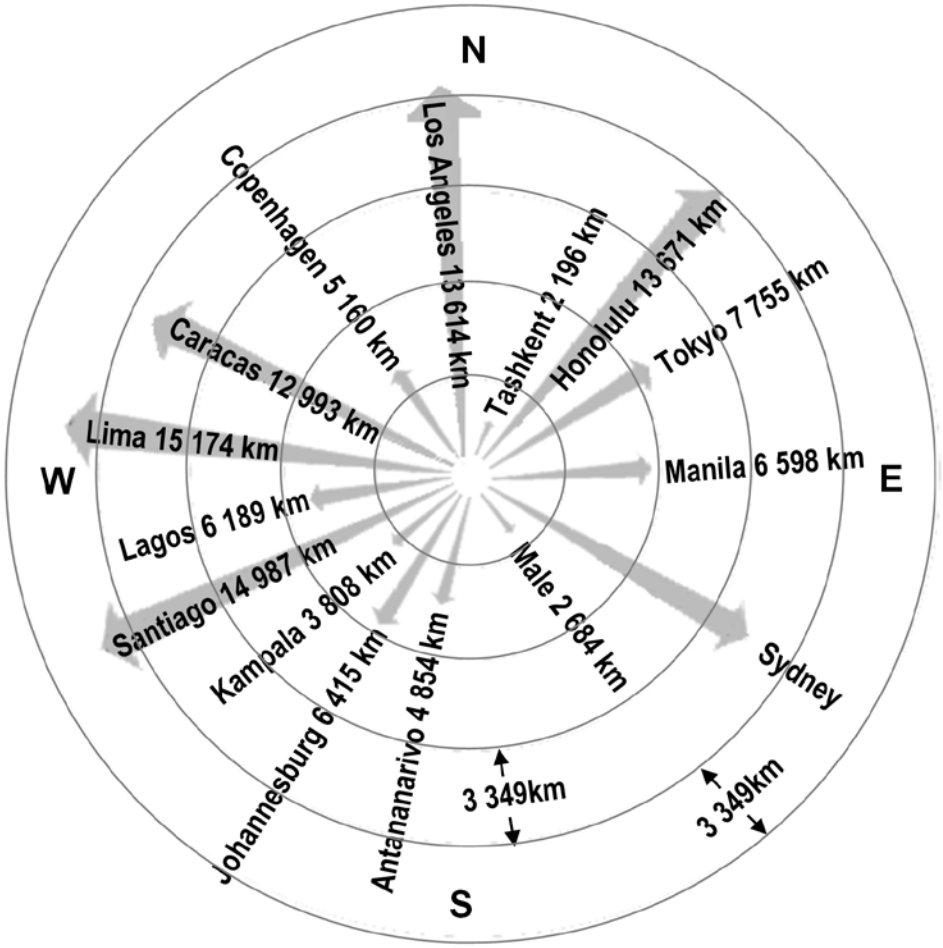
4.1.2 When she made her booking, Jackie also obtained information from the Internet regarding exchange rates and flight details, as shown in the tables given on ANNEXURE D.

Use the tables on ANNEXURE D to answer the following questions.

(a) Calculate the total cost, in rand, of the opera tickets and return airline tickets for both of them. (7)

(b) Calculate the time in South Africa when they arrive in Muscat. (2)

4.2 While Jackie was searching for more information about Muscat she came across the following distance chart. On the chart Muscat is the centre point of the concentric circles.



NOTE: Concentric circles are circles having the same centre.

[Source: www.dateandtime.com]

Use the distance chart above to answer the following questions.

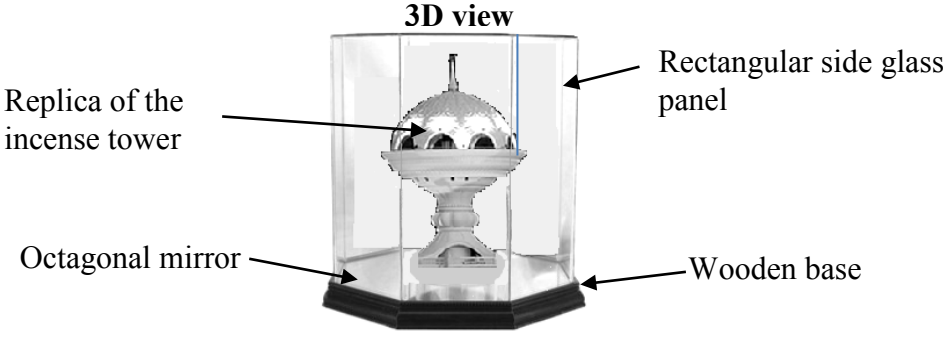
4.2.1 In what general direction is Johannesburg from Muscat? (2)

4.2.2 Kampala is a capital city in Africa. Explain why it would not be possible to calculate the distance between Johannesburg and Kampala using this distance chart. (2)

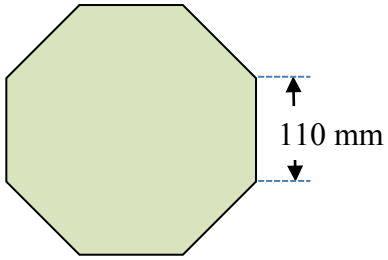
4.2.3 The distance between each of the concentric circles on the chart is 3 349 km, as shown on the chart. Calculate the approximate distance from Muscat to Sydney. (3)

4.3 Jackie bought a replica of the giant incense tower she saw in Muscat as a souvenir. She displays the replica in an octagonal glass display case with a wooden base as shown in the picture below. On top of the base is an octagonal mirror to enhance the display of the incense tower.
The inside dimensions of the identical rectangular side glass panels of the display case is 110 mm by 250 mm.
The inside surface area of the octagonal top is 0,058 423 m^2.

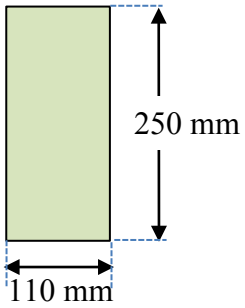
3D view



Top view of the octagonal display case



Rectangular side glass panel



NOTE: All eight sides of the octagon are equal in length.

The following formula may be used: **TSA = P × H + K**, where:

TSA = The total inside surface area of the octagonal display case, excluding the mirror
P = The perimeter of the octagonal base
H = The height of the rectangular side glass panels
K = The inside surface area of the octagonal top

4.3.1 Jackie would like to tint the inside of the glass using a special type of spray paint. This paint is sold in 250 mℓ spray cans.

The following information is printed on the side of the spray can:
- 100 mℓ of spray paint can cover 0,07 m^2 of glass per coating.
- Apply two coats.

Calculate the number of spray cans of paint needed to tint the glass of the display case. (8)

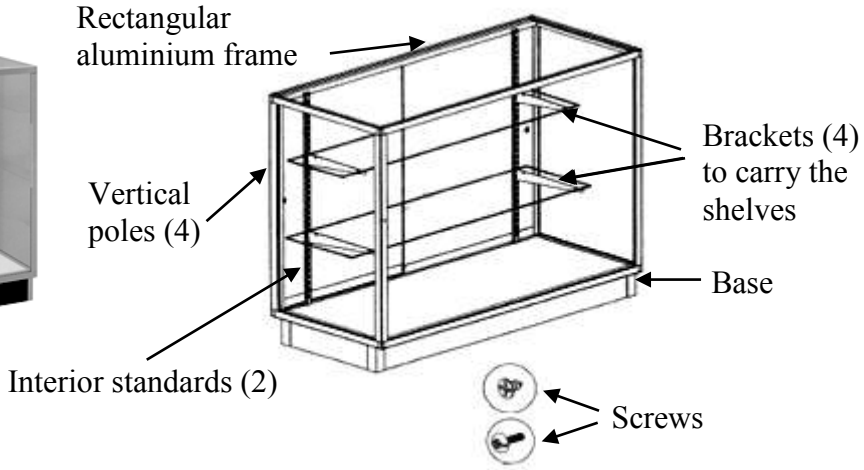
4.3.2 The scale of the replica is 1 **:** 164.

Calculate the actual height, in metres, of the tower if the height of the replica inside the display case is only 1 cm less than the height of the side glass panels. (3)

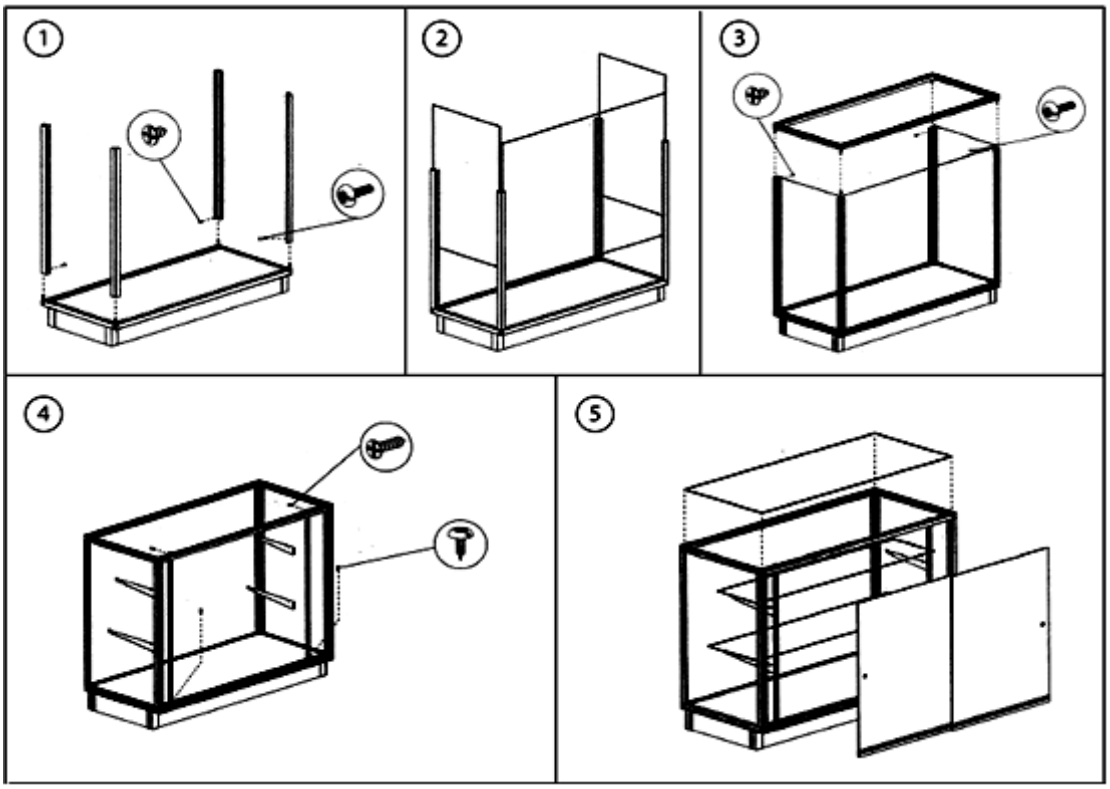
4.4 Jackie bought another glass display cabinet for her other souvenirs. The photograph and diagrams below show five diagrammatic instructions on how the display cabinet must be assembled.

Photograph of the glass display cabinet

Diagram of the completed glass display cabinet



Diagrammatic instructions to assemble the cabinet:



[Source: www.fireflystoresolutions.com]

Write a detailed set of instructions, using only the first FOUR diagrammatic instructions, to describe how the display cabinet should be assembled. (7)

[45]

TOTAL: 150

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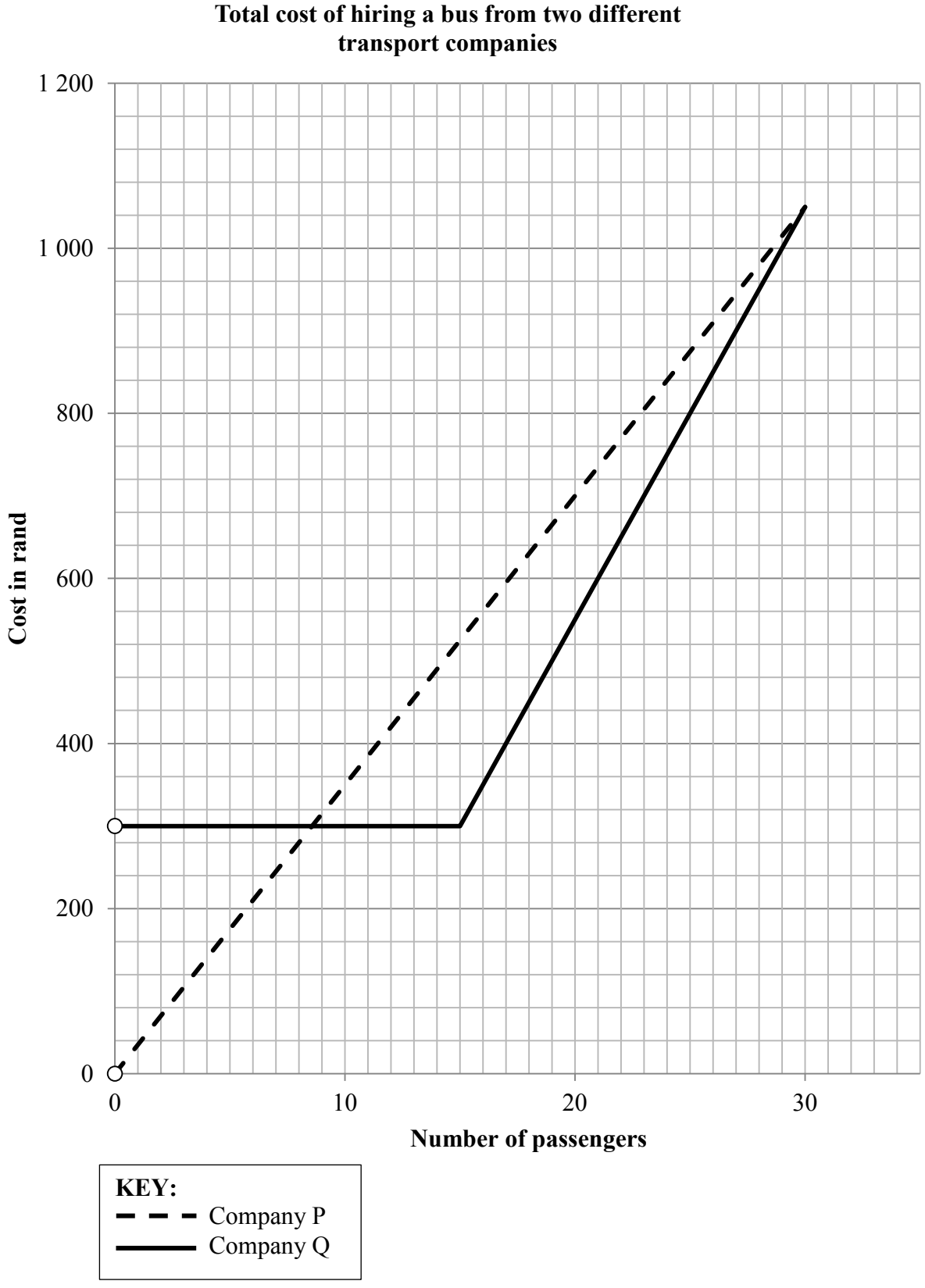
ANNEXURE A

QUESTION 1.3



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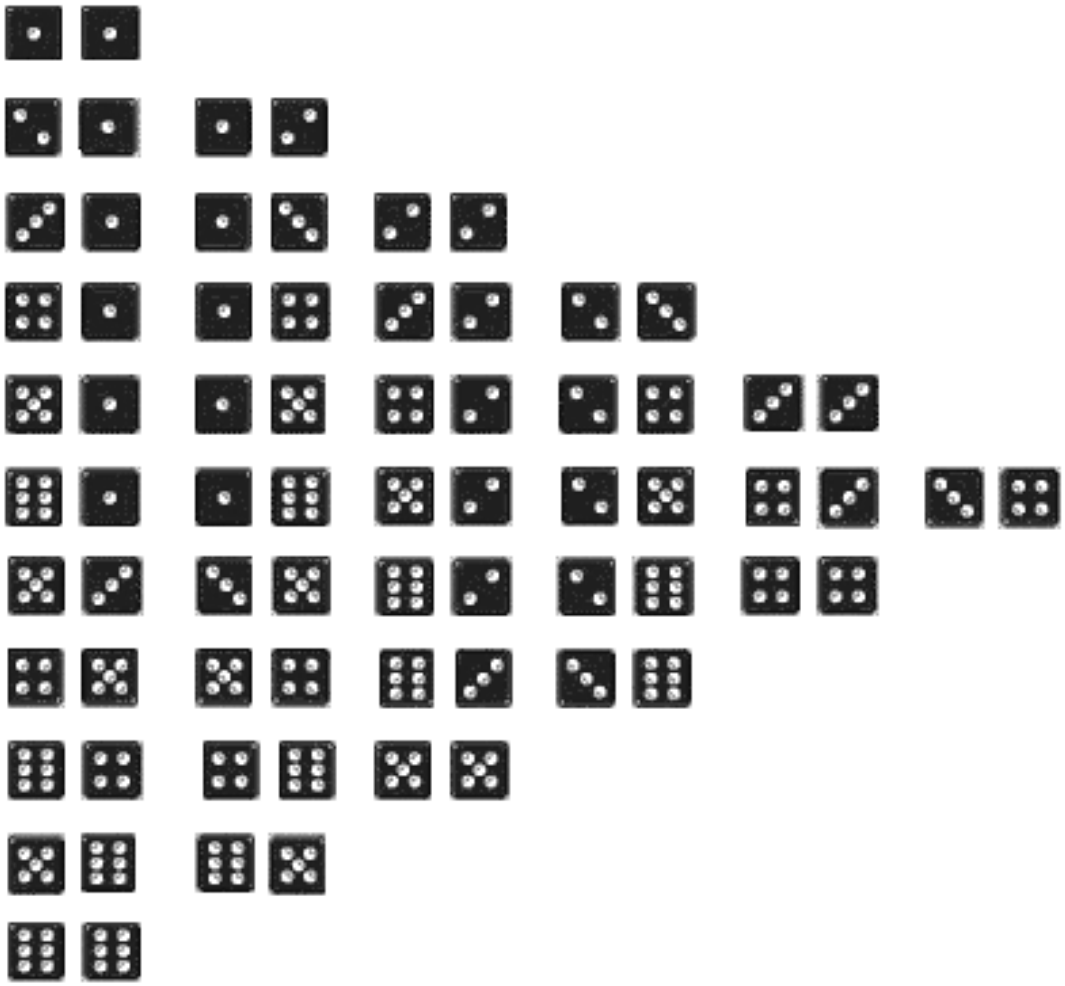
ANNEXURE B

QUESTION 1.3.3

A representation of all the possible outcomes of rolling two unbiased dice



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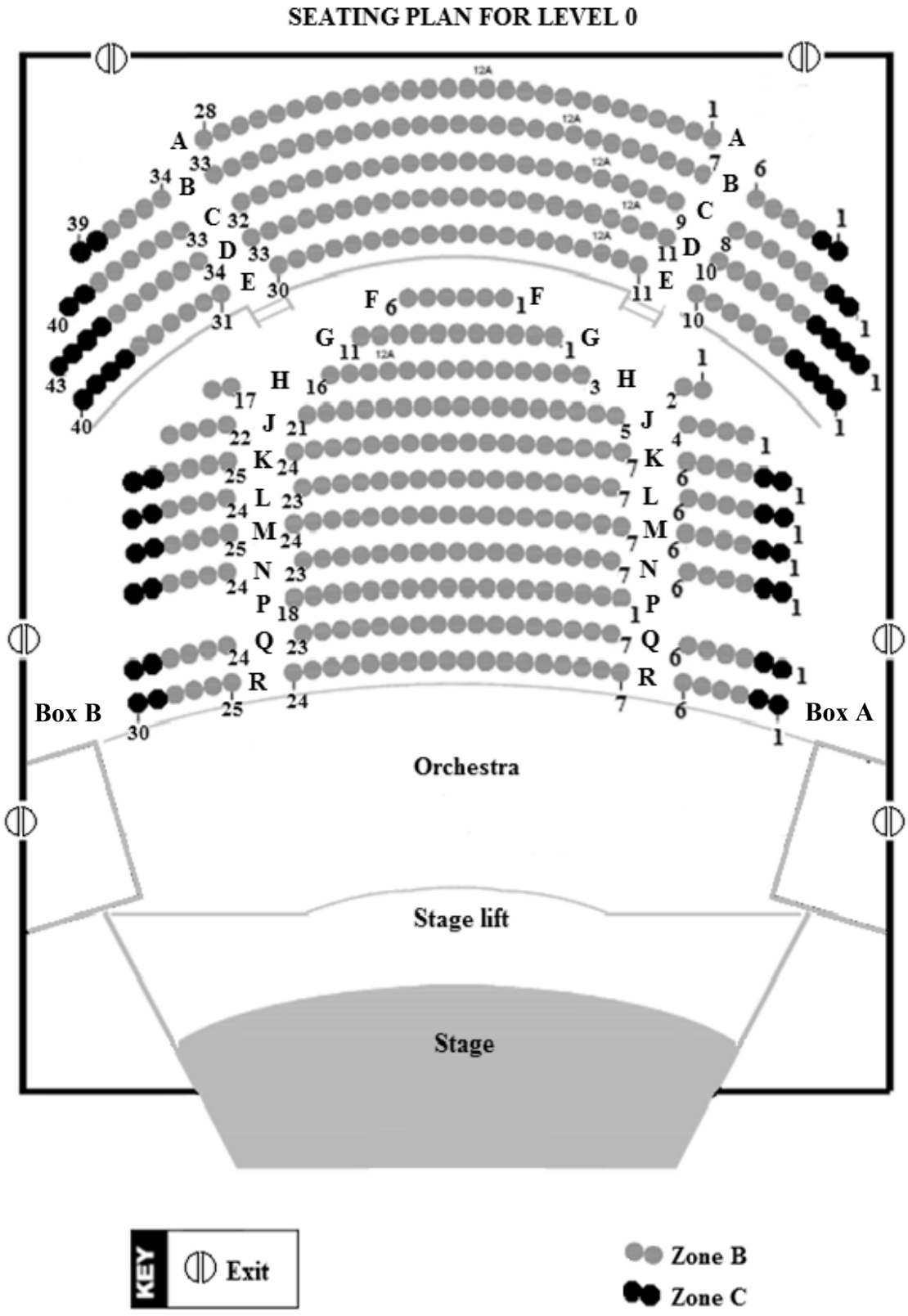
ANNEXURE C

QUESTION 4.1



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ANNEXURE D

QUESTION 4.1

TABLE 5: Exchange rates for the Omani rial

OR exchange rates				
	Indian Rupee (R)	Euro (€)	US dollar ($)	South African rand (R)
1 OR	156,188	1,87126	2,59673	27,2183

[Source: www.xe.com/currency/omr-omani-rial?c=ZAR]

TABLE 6: Flight details from Johannesburg to Muscat for the return flight of Jackie and her friend

€492,29 per passenger		**DEPARTURE TIME**		**ARRIVAL TIME**		**DURATION OF TRIP**
	Departure	20:30	Johannesburg	09:55	Muscat	11 hours 25 minutes
	Return	05:25	Muscat	17:10	Johannesburg	13 hours 45 minutes

Airline fare per passenger in euro; tax included; service fees not included

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