Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024

MATHEMATICAL LITERACY P2

MARKS: **150**

TIME: **3 hours**

This question paper consists of 14 pages and an addendum with 3 annexures.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

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

2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   - ANNEXURE A for QUESTION 1.2
   - ANNEXURE B for QUESTION 2.3
   - ANNEXURE C for QUESTION 4.3

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

4. Start EACH question on a NEW page.

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

6. Show ALL calculations clearly.

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

8. Indicate units of measurement, where applicable.

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

10. Write neatly and legibly.

QUESTION 1

1.1 A chef prepared a creamy chocolate mousse. Study the recipe below that she used and answer the questions that follow.

CREAMY CHOCOLATE MOUSSE RECIPE

INGREDIENTS

50 g Cocoa powder
125 mℓ Whipped double cream
35 g Powdered sugar
1 Egg
125 g White chocolate
½ Cup of milk
Almond or vanilla flavouring

Preparation time: 15 minutes
Cooking time: 6 minutes
Servings: 4 people

METHOD

- Grate the chocolate and melt in a pot.
- Whisk egg white, powdered sugar, cream and milk together until smooth. Add the mixture to the melted chocolate. Cook for six minutes while stirring.
- Spoon the mixture into glasses, sprinkle the cocoa powder and almond or vanilla flavouring on top and chill in the fridge for one hour.

Use the information above to answer the questions that follow.

1.1.1 Convert the heavy whipping cream to litres. (2)

1.1.2 Determine the number of grams of cocoa powder needed for 12 people. (2)

1.1.3 Determine the total time that it will take to repeat the recipe twice. (2)

1.1.4 The mousse was ready for serving at 12:05. At what time did the chef start to make the mousse? (2)

1.2 Mandla lives in Durban and found a new job in Thaba Nchu (63 km east of Bloemfontein).

The map in ANNEXURE A shows the national roads of South Africa on which Mandla will travel to and from work.

Use the map in ANNEXURE A and the information above to answer the following questions.

1.2.1 Choose the TWO types of scales NOT used on the map. Write down only the letters that represent the correct scales.

A Word scale
B Bar scale
C Ratio scale (2)

1.2.2 Identify the town where the N1 and the N5 join. (2)

1.2.3 Determine the number of national roads on the map with an even number. (2)

1.2.4 If Mandla drives from Durban on the national roads and does not turn left on the N8 at Bloemfontein but continues on the N1. What is the first town that he will pass according to the map? (2)

1.3 Polokwane District Municipality supplied 920 schools with 2 water tanks each to reduce the cost of municipal water bills that schools must pay for water and sanitation.

The diameter of each tank is 132 cm and the height is 1,5 m.

The tank has a water storage capacity of 2,05 kilolitres.

[Adapted from https://www.builders.co.za/watertanks]

Use the information above to answer the questions that follow.

1.3.1 Determine the radius of one water tank in centimetres. (2)

1.3.2 Calculate the total number of tanks supplied to the 920 schools. (2)

1.3.3 Write down the correct unit of measurement for volume using only the letters A, B or C.

A centimeters
B cubic meters
C square millimeters (2)

1.3.4 Explain the term *diameter*. (2)

1.4 Lindiwe is busy planning for the month of October 2024. The calendar of October 2024 is given below.

CALENDAR FOR THE MONTH OF OCTOBER 2024

SUN	MON	TUE	WED	THURS	FRI	SAT
		1 ***Schools re-open***	2	3 ***Mom's birthday***	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19 ***Youth camp***
20 ***Youth camp***	21	22 ***Mathematical Literacy Mock Examination***	23	24	25	26
27 ***Granny arrives to visit***	28	29	30	31 ***Granny goes back home***		

[Adapted from www.skillsportal.co.za/content/schoolcalender]

Use the information above to answer the questions that follow.

1.4.1 Write down the number of days granny comes to visit. (2)

1.4.2 Lindiwe's mom will be 57 years old on 3 October 2024.

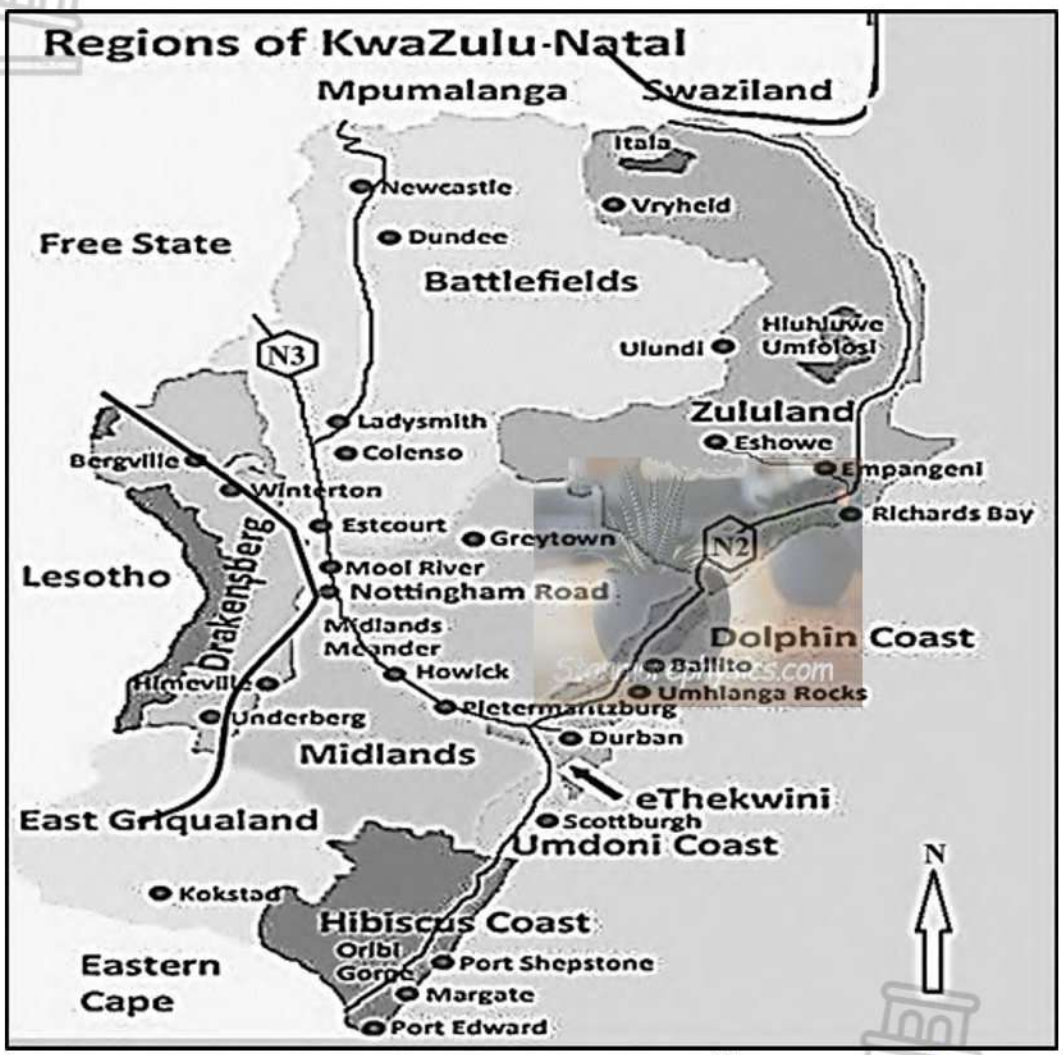
Determine the year in which Lindiwe's mom was born. (2)

[28]

QUESTION 2

2.1 Mrs Thazibane lives in Lesotho. She is planning a holiday in KwaZulu-Natal. She plans on going to Vryheid and a few other places. Below is the map that she will use to decide on all the places to visit.

Map showing regions of KwaZulu-Natal



[Source: www.googlemaps.com]

Use the information above to answer the questions that follow.

2.1.1 Identify the type of roads indicated on the map. (2)

2.1.2 What is the general direction of Vryheid from Lesotho? (2)

2.1.3 Which province is south of Lesotho, excluding KwaZulu-Natal? (2)

2.1.4 The distance from Lesotho to Vryheid is 614,6 km and Mrs Thazibane is driving at an average speed of 120 km/h. Determine how long it will take her to reach Vryheid. Give your final answer in hours and minutes.

You may use the following formula: $\textbf{Speed} = \frac{\textbf{Distance}}{\textbf{Time}}$

(4)

2.2 Mrs Thazibane has decided to stop in the Free State before leaving to Vryheid. The car she drives has a fuel consumption of 5,9 litres per 100 km and the cost of petrol is R24,45 per litre.

2.2.1 Give Mrs Thazibane a clear set of directions to get to Eshowe from the Free State, where she plans to spend a day with family, before going to Vryheid. (3)

2.2.2 Determine the number of litres of petrol Mrs Thazibane will need for a return trip from Lesotho to Vryheid. (3)

2.2.3 Hence, calculate the petrol cost for Mrs Thazibane's return trip. (2)

2.3 Mrs Thazibane registered her daughter at one of the tertiary institutions in Lesotho.

ANNEXURE B illustrates the layout plan of the second floor of the tertiary institution.

Use the layout plan in ANNEXURE B to answer the following questions.

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

2.3.2 Identify ONE feature on this layout plan that indicates that this is a multi-storey building. (2)

2.3.3 Which entrance is the furthest from the library? (2)

2.3.4 Determine the number of restrooms available on this layout plan. (2)

2.3.5 Determine the probability of finding a Science Laboratory on the second floor. (2)

2.3.6 Measure, in mm, the length of the south facing wall of the presentation room. (2)

2.3.7 Hence, calculate the actual length of the south facing wall of the presentation room in metres, using the given scale. Give your answer to the nearest metre. (4)

[34]

QUESTION 3

3.1 Queens High School decides to tile the floor of their school hall using square-shaped dark blue tiles.

The hall is rectangular-shaped. A smaller rectangular stage is located against the front wall of the hall as illustrated in the diagrams below.

The length of the stage is 10 metres, and the width is 5,5 metres. The stage will not be tiled.

The length of each side of one tile is 60 cm.

The school needs to determine the number of tiles needed.

Example of image of tiled school hall

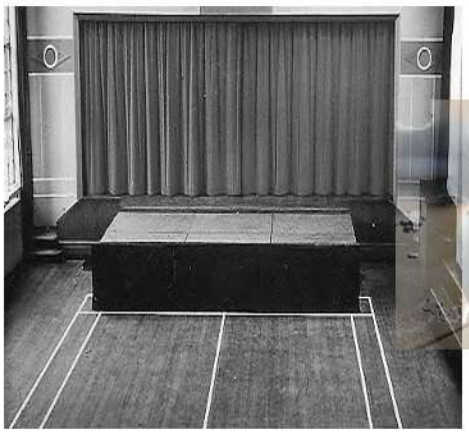
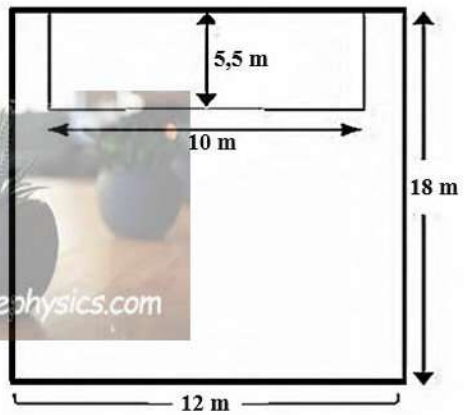


Diagram of the floor plan of the school hall with dimensions



You may use the following formulae:
Area of a square = side × side
Area of a rectangle = length × width

3.1.1 Calculate the area of the floor of the school hall to be tiled, considering that the stage will not be tiled. (5)

3.1.2 The tiler requires 10% more tiles to be purchased to complete the tiling job.

(a) Calculate the area of one tile that will be used. Give your answer in m^2. (3)

(b) Hence, determine how many tiles must be bought including the extra 10%. (3)

(c) Provide ONE reason for the 10% extra tiles required by the tiler. (2)

3.1.3 Determine the unit scale used to draw the floor plan if the length of the wall is 60 mm. Write your final answer as 1 : … (3)

3.2 Ms Johnson, the chairperson of the Awards Committee at Queens High, is designing the prize-giving certificates for the annual prize-giving ceremony.

The certificate will have a shaded border of 2,5 cm, as shown in the diagram below. The length of the certificate is 28,5 cm and the width 22 cm.

A performance level circular sticker with a radius of 8 cm is placed at the bottom of the certificate.

The diagram of the certificate for the prize-giving

Use the above information to answer the questions that follow.

3.2.1 Calculate the diameter of the circle in millimetre. (2)

3.2.2 Determine the dimensions of the certificate without the shaded border. (3)

3.2.3 Hence, calculate the perimeter of the inside (without border) of the certificate.

You may use the following formula:

Perimeter = 2 (length + width) (2)

3.2.4 Ms Johnson claims that the area of the unshaded part (excluding the border and the circle) of the certificate to the nearest squared centimetre, is 198 cm^2.

Verify, with the necessary calculations, whether her statement is valid or not.

You may use the following formulae:

Area of a rectangle = length × width
Area of a circle = 3,142 × radius^2 (7)

[30]

QUESTION 4

4.1 FedEx Express is an international courier service company that provides rapid, reliable and time-definite delivery to more than 220 countries and territories.

To send a 5 kg box anywhere in South Africa, it will cost R2 250.

The dimensions of a 5 kg box are shown below:

NOTE: 1 inch = 25,4 mm

[Adapted from www.fedex.com/en-us/tracking.html]

Use the above information to answer the questions that follow.

4.1.1 Calculate, in mm^3, the volume of a 5 kg box.

You may use the formula: **Volume = length × width × height** (3)

4.1.2 One of the drivers stated that the surface area of the 5 kg box is more than 2 m^2. Verify, with the necessary calculations, whether the driver's statement is valid or not.

You may use the following formula:

Total surface area = 2 (l × w) + 2 (l × h) + 2 (w × h) (5)

4.1.3 Many of the parcels are transported with E-transit delivery trucks. Given below are the dimensions of a FedEx E-transit delivery truck.

Dimensions of E-transit delivery truck

Length = 2,2 m
Width = 1,5 m
Height = 1,6 m

Calculate the maximum number of 5 kg boxes that can fit into the delivery truck. (5)

4.2 FedEx travels from Detroit to Denver either by truck or plane. The travelling time by truck is approximately 18 hours 48 minutes.

[Adapted from www.googlemaps.com]

Study the map above and answer the questions that follow.

4.2.1 Calculate the average speed of the delivery truck (in miles/hour) travelling from Detroit to Denver.

You may use the following formula:

Distance = Speed × Time (4)

4.2.2 The flight distance between Detroit and Denver is 1 862 km, which is equal to 1 157 miles. Determine how many kilometres there are in one mile, rounded to 3 decimal places. (3)

4.3 Charles works for a seed company, helping schools to produce their own vegetable gardens. These vegetables are planted in greenhouses.

ANNEXURE C illustrates the structure of a greenhouse and all the related information.

Use ANNEXURE C to answer the questions below.

4.3.1 Calculate how many arches would be needed to build 5 greenhouses. (2)

4.3.2 The greenhouse is 20 metres in length and held upright using aluminium poles planted 5 metres apart. Determine the number of poles needed to keep one greenhouse upright. (2)

4.3.3 Charles claims that more than 50 steel rods will be needed to construct one greenhouse. Verify, with calculations, whether his statement is valid or not. (3)

4.3.4 The water tank that is included in the package is a rectangular prism as shown in the diagram below.

The dimensions of the water tank are as follow:

Length = 1,2 m
Width = 1 m
Height = 140 cm

NOTE:
1 m^3 = 1 kilolitre

Calculate, in kilolitres, the capacity that the water tank can store.

You may use the following formula:

Volume of a rectangular prism = length × width × height (4)

4.3.5 The package includes a chemical mask.

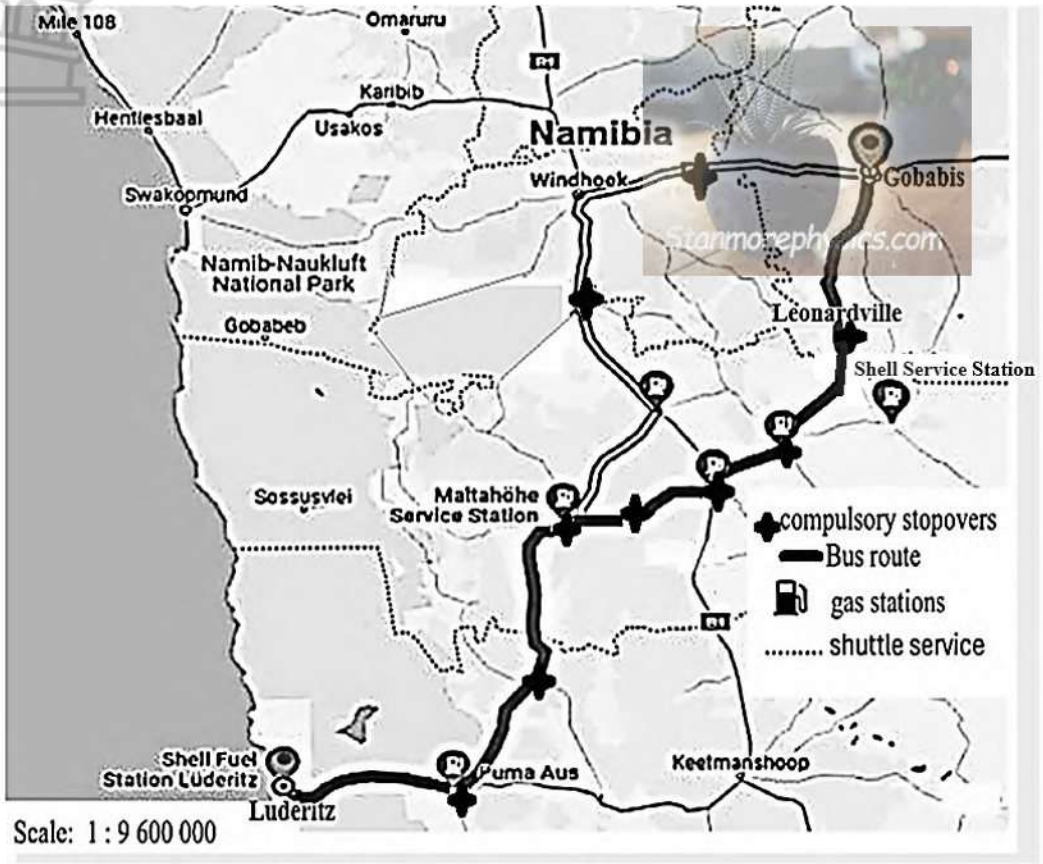
Explain why a chemical mask is included in the package. (2)

4.3.6 There are many ways to fill the water tank. Mention ONE way how the water tank can be filled with water. (2)

[35]

QUESTION 5

5.1 Thembani works in Gobabis as an Electrical Engineer but lives in Lüderitz. He decided to travel by bus to minimise travelling expenses. Below is the map, the bus will use from Gobabis to Lüderitz. The travelling distance between Gobabis and Lüderitz is 815,6 km.



[Adapted from www.googlemaps.com]

Use the information and the map above to answer the following questions.

5.1.1 Determine the probability (as a percentage) of finding a petrol station that is NOT directly on the route between Gobabis and Lüderitz. (3)

5.1.2 The actual distance from Gobabis to Leonardville is 144,9 km. Determine the distance, in metres, from Leonardville to Lüderitz. (3)

5.1.3 Hence, use the given scale and determine the map distance between Gobabis and Lüderitz in centimetres to ONE decimal place. (3)

5.1.4 Calculate the time that the bus spent on the **ROAD** if the bus travelled at an average speed of 80 km/h between Gobabis and Luderitz.

NOTE: Taking into account that every compulsory stopover was 15 minutes.

You may use the following formula: $\textbf{Speed} = \frac{\textbf{Distance}}{\textbf{Time}}$ (6)

5.2 Pam, the sales manager at AGM, and her team discussed various strategies to improve their sales of perfume.

One of these strategies is to package their perfume using a cylindrical bottle and a rectangular bottle. The bottles will be filled to 90% capacity.

The picture below shows the bottles and the dimensions of the bottles.

Cylindrical bottle	Rectangular bottle
 Radius = 4 cm Height = 5 cm	 Length = 7 cm Width = 3,5 cm Height = 7 cm

5.2.1 Explain why the perfume bottles are not filled to its maximum capacity. (2)

5.2.2 In one month, AGM storage workers packed 75 perfume bottles as cylindrical and rectangular bottles, in the ratio 2 : 3 in a box. Determine the probability of selecting a rectangular bottle from the box. (3)

5.2.3 Pam claims that if the volume of one rectangular bottle rounded off to the nearest whole number, then the capacity of the rectangular bottle or cylindrical bottle would be the same. The volume of the rectangular bottle is 172 cm^3.

Verify, with the necessary calculations, whether Pam's claim is valid or not.

You may use the following formula:

Volume of a cylindrical bottle = 3,142 × radius^2 × height (3)

[23]

TOTAL: 150

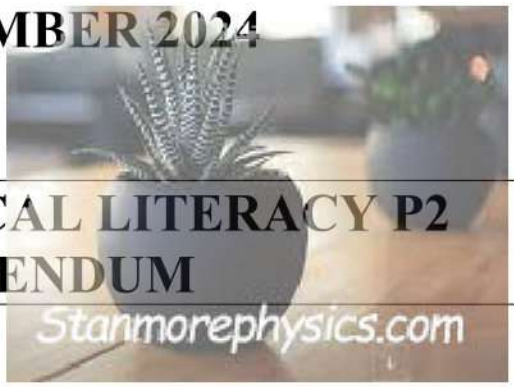
Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024

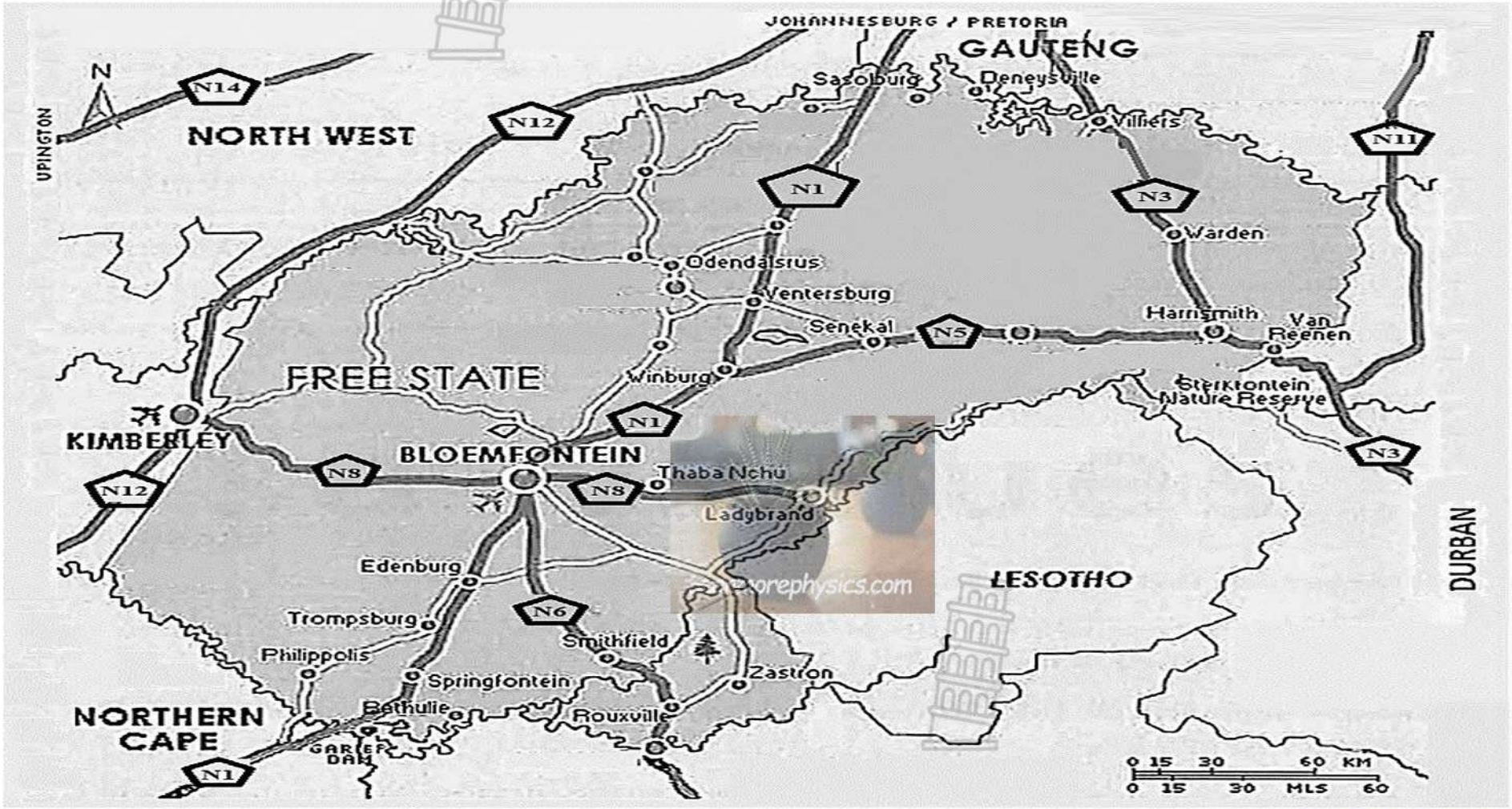


MATHEMATICAL LITERACY P2 ADDENDUM

This addendum consists of 4 pages with 3 annexures.

ANNEXURE A: QUESTION 1.2

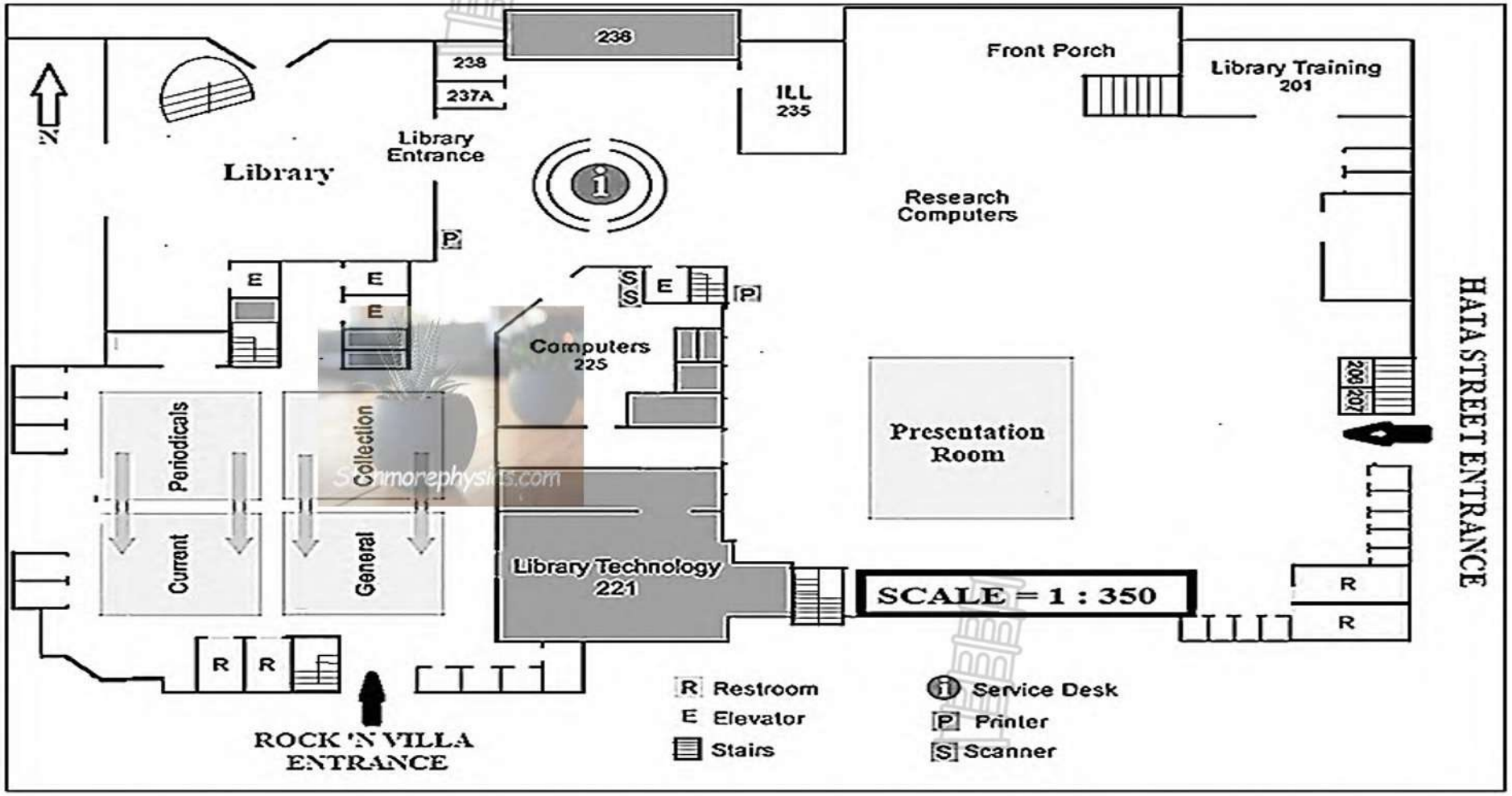
MAP SHOWING NATIONAL ROADS OF SOUTH AFRICA



[Source: www.googlemaps.com]

ANNEXURE B: QUESTION 2.3

THE LAYOUT PLAN OF THE SECOND FLOOR OF THE TERTIARY INSTITUTION



ANNEXURE C: QUESTION 4.3

THE STRUCTURE OF A GREENHOUSE AND ALL THE RELATED INFORMATION.

STRUCTURE OF A GREENHOUSE

Measurements of greenhouse:
10 m × 7 m × 2,1 m

Construction:

- 11 arches places 2 metres apart to form the tunnel effect
- Each arch is anchored with 5 steel rods

Package includes:

- Greenhouse frame and coverage (net)
- Drip irrigation kit
- Water tank
- Free fertiliser for first cycle of production
- Seeds for first vegetable plantation
- Chemical mask

[Adapted from www.google.com/greenhouses]

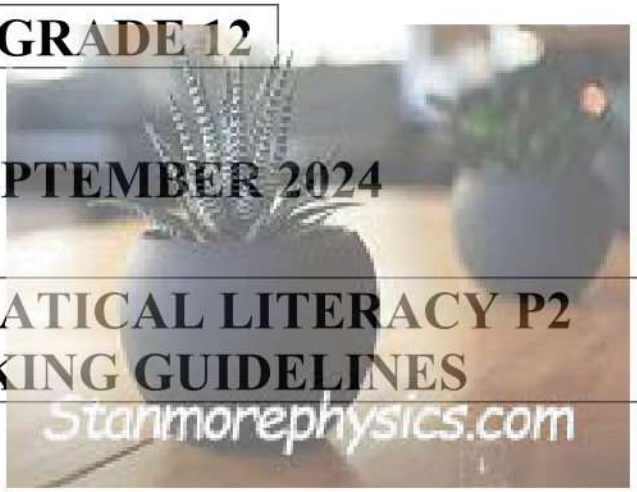
Province of the
EASTERN CAPE
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo
Provinsie van die Oos Kaap: Department van Onderwys
Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2024



MATHEMATICAL LITERACY P2
MARKING GUIDELINES

MARKS: 150

Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT	Reading from a table/graph/diagram
SF	Correct substitution in a formula
O	Opinion/Explanation/Reasoning
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding Off/Reason
NPR	No penalty for correct rounding minimum two decimal places
AO	Answer only
MCA	Method with consistent accuracy
RCA	Rounding with consistent accuracy

This marking guidelines consist of 12 pages.

MARKING GUIDELINES

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- If a candidate has crossed out (cancelled) an attempt to a question and NOT redone the solution, mark the crossed out (cancelled) version.
- Consistent Accuracy (CA) applies in ALL aspects of the marking guidelines; however, it stops at the second calculation error.
- If the candidate presents any extra solution when reading from a graph, table, layout plan and map, then penalise for every extra incorrect item presented.

LET WEL:

- *As 'n kandidaat 'n vraag TWEE keer beantwoord, merk slegs die EERSTE poging.*
- *As 'n kandidaat 'n antwoord van 'n vraag doodtrek (kanseleer) en nie oordoen nie, merk die doodgetrekte (gekanseleerde) poging.*
- *Volgehoue akkuraatheid (CA) word in ALLE aspekte van die nasienriglyne toegepas, maar dit hou by die tweede berekeningsfout op.*
- *Wanneer 'n kandidaat aflees van 'n grafiek, tabel, uitlegplan, en kaart en ekstra antwoorde gee, penaliseer vir elke ekstra verkeerde item.*

KEY TO TOPIC SYMBOL:
F = Finance; M = Measurement; MP = Maps, Plans and Other representations; P = Probability

QUESTION 1 [28 MARKS] **ANSWER ONLY FULL MARKS**

Ques.	Solution	Explanation	Level
1.1.1	Volume of heavy whipping cream = $\frac{125}{1\,000}$ ✓M = 0,125 litres ✓A	1M divide by 1000 1A answer (2)	M L1
1.1.2	Grams of cocoa powder needed for 12 people = $\frac{50}{4} \times 12$ ✓MA = 150 g ✓A **OR** Grams of cocoa powder needed for 12 people = $\frac{12}{4} \times 50$ ✓MA = 150 g ✓A	1MA divide by 4 and multiply by 12 1A answer **OR** 1MA divide by 4 and multiply by 50 1A answer (2)	M L1
1.1.3	Total time = (15 min + 6 min) = 21 min × 2 ✓MA = 42 minutes ✓A	1MA adding time and multiply by 2 1A answer (2)	M L1
1.1.4	Time = 12:05 = 0:21 (prep. and cooking) = 1:00 (chilling) ✓M = 10:44 ✓A	1M subtracting both times 1A correct time (2)	M L1
1.2.1	A **OR** Word Scale ✓A **AND** C **OR** Ratio Scale ✓A	1A first scale 1A second scale (2)	MP L1
1.2.2	Winburg ✓✓A	2A correct town (2)	MP L1
1.2.3	4 national roads ✓✓RT	2RT number of national roads (2)	MP L1
1.2.4	Edenburg ✓✓RT	2RT correct town (2)	MP L1
1.3.1	Radius = 132 ÷ 2 ✓M = 66 cm ✓A	1M divide by 2 1A correct radius (2)	M L1

1.3.2	Total number of tanks = 920 × 2 ✓MA = 1 840 ✓A	1MA multiply correct values 1A number of tanks (2)	M L1
1.3.3	B✓✓A **OR** cubic metres ✓✓A	2A correct unit (2)	M L1
1.3.4	The diameter is the distance from one side of the circle to the other side of the circle, through the centre of the circle. ✓✓A	2A definition (2)	M L1
1.4.1	Number of days = 5 ✓✓A **(Accept 4 days = 1 Mark)**	2A correct number of days (2)	M L1
1.4.2	Year born = 2024 – 57 ✓M = 1967 ✓A	1M subtracting 57 from 2024 1A correct year (2)	M L1
		[28]	

QUESTION 2 [34 MARKS]

Ques.	Solution	Explanation	Level
2.1.1	National Roads ✓✓A	2A correct road (2)	MP L1
2.1.2	Northeast **OR** NE ✓✓A	2A correct direction (2)	MP L1
2.1.3	Eastern Cape ✓✓A	2A correct province (2)	MP L2
2.1.4	Speed $= \frac{\text{Distance}}{\text{Time}}$ $120 \text{ km/h} = \frac{614{,}6 \text{ km}}{\text{Time}}$ ✓SF $\text{Time} = \frac{614{,}6 \text{ km}}{120 \text{ km/h}}$ ✓MA $= 5{,}121666667$ hours $0{,}12166\ldots \times 60 = 7{,}3$ minutes ✓C Time taken to reach Vryheid = 5 hours and 7,3 minutes✓CA **(Accept 5 hours and 7 minutes)**	1SF substitution 1MA change subject and answer 1C hours to minutes 1CA total time (4)	MP L3
2.2.1	• From the Free State, drive on the N3 till she reaches Pietermaritzburg. ✓O • Pass Pietermaritzburg and turn left onto the N2. Continue driving on the N2 till she passes Richard's Bay, turn left and pass Empangeni. ✓O • Continue on the road from Empangeni until she reaches Eshowe. ✓O **(Accept any other relevant explanation.)**	1O N3 1O left on N2 and passing Richard's Bay and Empangeni 1O continue to Eshowe from Empangeni (3)	MP L4
2.2.2	Number of litres of petrol $= \frac{5{,}9}{100} \times 614{,}9\ l$ ✓MA $= 36{,}2614 \times 2$ ✓M $= 72{,}5228$ $\approx 72{,}523$ litres ✓CA **(Accept 72,5 OR 72,52)**	1MA dividing correct values and multiply by 614,9 1M multiply by 2 1CA number of litres **NPR** (3)	
2.2.3	Petrol cost = 72,523 litres × R24,45 ✓MCA = R1 773,18735 ≈ R1 773,19 ✓CA	**CA from 2.2.2** 1MCA multiply by R24,45 1CA answer (2)	F L1

2.3.1	One unit on the map represents 350 units in reality. ✓✓A **OR** ✓✓A One unit on the map equals 350 units on the floor.	2A explanation (2)	MP L1
2.3.2	Elevator ✓✓A **OR** Stairs ✓✓A	2A one correct feature (2)	MP L1
2.3.3	Hata Street entrance ✓✓A	2A correct entrance (2)	MP L1
2.3.4	Number of restrooms = 4 ✓✓A	2A correct number of restrooms (2)	MP L2
2.3.5	Impossible **OR** None **OR** 0 **OR** 0% ✓✓A	2A answer (2)	P L2
2.3.6	34 mm ✓✓A **(Accept 33 – 35 mm)**	2A correct length in mm (2)	MP L1
2.3.7	Actual length = 34 × 350 = 11 900 mm ✓MCA $\therefore = \frac{11\,900}{1\,000}$ ✓C = 11,9 m ✓MCA = 12 m ✓R **(Accept 11,55 m – 12,25 m) and (12 m)**	**CA from 2.3.6** 1MCA multiply with correct scale and answer 1C divide by 1000 1MCA answer 1R rounding (4)	MP L2
		[34]	

QUESTION 3 [30 MARKS]

Ques.	Solution	Explanation	Level
3.1.1	Area of rectangular school hall = length × width = 18 m × 12 m ✓SF = 216 m^2 ✓A Area of stage = length × width = 10 m × 5,5 m = 55 m^2 ✓A Area of floor to be tiled = 216 m^2 – 55 m^2 ✓MCA = 161 m^2 ✓CA	1SF substitution 1A area 1A area 1MCA subtracting areas 1CA answer (5)	M L3
3.1.2 (a)	Area of tile = 60 cm × 60 cm ✓M = 3 600 cm^2 = $\frac{3\,600}{100 \times 100}$ ✓C = 0,36 m^2 ✓CA **OR** ✓C Area of tile = 0,6 m × 0,6 m ✓M = 0,36 m^2 ✓CA	1M calculating area 1C conversion 1CA area in m^2 **OR** 1C conversion 1M calculating area 1CA area in m^2 (3)	M L2
3.1.2 (b)	Number of tiles needed = $\frac{161}{0,36}$ ✓MCA = 447,22… × 1,1 ✓M = 491,94 … ≈ 492 tiles ✓CA	**CA from 3.1.1 and 3.1.2(a)** 1MCA dividing correct values 1M multiply by 10% 1CA number of tiles (3)	M L2
3.1.2 (c)	Cutting **OR** breakages **OR** wastage ✓✓O	2O reason (2)	M L4

3.1.3	Scale = 60 mm : 18 m ✓M = 60 : 18 000 ✓C ✓S ✓C = 1: 300 **OR** ✓M Scale = 60 mm: 18 m = 0,06: 18 ✓C = 1 : 300 ✓S	1M correct ratio 1C converting 18m to mm 1S unit ratio **OR** 1M correct ratio 1C converting 6 mm to m 1S unit ratio (3)	M L3
3.2.1	Diameter = 8 cm × 2 ✓M = 16 cm × 10 = 160 mm ✓C **OR** ✓C Diameter: 8 cm × 10 = 80 mm ✓M ∴ 80 mm × 2 = 160 mm	1M multiplying by 2 1C diameter in mm **OR** 1C diameter in mm 1M multiplying by 2 (2)	M L2
3.2.2	Dimensions of unshaded part: Length = 28,5 cm – 2,5 cm – 2,5 cm ✓M = 23,5 cm ✓CA Width = 22 cm – 2,5 cm – 2,5 cm = 17 cm ✓CA	1M subtracting 2,5 twice from length 1CA length 1CA width (3)	M L3
3.2.3	Perimeter = 2 (length + width) = 2 (23,5 cm + 17 cm) ✓SF = 81 cm ✓CA	**CA from 3.2.2** 1SF correct length and width 1CA perimeter (2)	M L1
3.2.4	Area of certificate without border and (circle included) = length × width = 23,5 cm × 17 cm ✓SF = 399,5 cm^2 ✓MCA Area of circle = 3,142 × radius^2 = 3,142 × 8^2 ✓SF = 201,088 cm^2 ✓CA ∴ Area of unshaded part (excluding border and circle): = 399,5 cm^2 – 201,088 cm^2 ✓MCA = 198,412 cm^2 ≈ 198 cm^2 ✓CA ∴ Her statement is valid ✓O	**CA from 3.2.2** 1SF correct dimensions 1MCA area 1SF substitution 1CA area of circle 1MCA subtracting areas 1CA unshaded area 1O opinion (7)	M L4
		[30]	

QUESTION 4 [35 MARKS]

Ques.	Solution	Explanation	Level
4.1.1	Dimensions in mm = 17 inch × 25,4 = 431,8 mm ✓C ∴ Volume = length × width × height = 431,8 mm × 431,8 mm × 431,8 mm ✓SF = 80 509 645,43 mm^3 ✓CA	1C converting dimension 1SF substitution 1CA volume (3)	M L2
4.1.2	Total surface area: = 2 (l × w) + 2 (l × h) + 2 (w × h) = 2 (431,8 × 431,8) + 2 (431,8 × 431,8) + 2 (431,8 × 431,8) ✓SF = 372 902,48 + 372 902,48 + 372 902,48 ✓M = 1 118 707,44 mm^2 ∴ TSA = $\frac{1\,118\,707,44}{1\,000\,000}$ ✓C = 1,12 m^2 ✓CA **(Accept 1,119 m^2)** ∴ His statement is invalid ✓O **OR** Total surface area: = 2 (l × w) + 2 (l × h) + 2 (w × h) = 2 (0,4318 × 0,4318) + 2 (0,4318 × 0,4318) + 2 (0,4318 × 0,4318) ✓C ✓SF = 0,37290248 + 0,37290248 + 0,37290248 ✓M = 1,12 m^2 ✓CA **(Accept 1,119 m^2)** ∴ His statement is invalid ✓O	1SF substitution 1M multiply by 2 1C conversion 1CA surface area 1O opinion **OR** 1C conversion 1SF substitution 1M multiply by 2 1CA surface area 1O opinion **NPR** (5)	M L4
4.1.3	Number of boxes in length = $\frac{2,2}{0,4318}$ ✓M = 5,094… = 5 boxes ✓A Number of boxes in width = $\frac{1,5}{0,4318}$ = 3,473… = 3 boxes ✓A Number of boxes in height = $\frac{1,6}{0,4318}$ = 3,705… = 3 boxes ✓A Total number of boxes = 5 × 3 × 3 = 45 boxes ✓MCA	1M dividing correct values 1A number of boxes 1A correct number of boxes 1A correct number of boxes 1MCA multiplication and total number of boxes (5)	MP L3

4.2.1	Distance = Speed × Time 18h48min = 18,8 hrs ✓C 1 268 = Speed × 18,8 h ✓SF ∴ Speed = $\frac{1\,268}{18,8}$ ✓M = 67,45 miles/h ✓CA **(Accept 67 OR 67,447 OR 67,5 miles/h)**	1C converting time 1SF substitution 1M changing subject 1CA speed **NPR** (4)	MP L3
4.2.2	1 157 miles = 1 862 km 1 mile = $\frac{1\,862}{1\,157}$ ✓M = 1,609334… ✓CA ≈ 1,609 km ✓R	1M dividing by 1 157 1CA answer 1R rounding (3)	MP L2
4.3.1	Number of arches needed = 11 × 5 ✓MA = 55 arches ✓A	1MA multiply correct values 1A number of arches (2)	M L2
4.3.2	Number of poles needed = $\frac{20}{5}$ ✓M = 4 poles ✓CA	1M dividing by 5 1CA number of poles (2)	M L2
4.3.3	Number of steel rods needed = 11 arches × 5 pegs ✓M = 55 steel rods ✓CA The statement is valid ✓O	1M multiply correct values 1CA simplification 1O opinion (3)	M L4
4.3.4	Volume of a rectangular prism = length × width × height ✓C = 1,2 × 1 × 1,4 ✓SF = 1,68 m^3 ✓CA = 1,68 kl ✓C	1C conversion 1SF substitution 1CA simplification 1C total kilolitres (4)	M L3
4.3.5	Mask is for protection when spraying fertilisers. ✓✓O	2O opinion (2)	M L4
4.3.6	Rainwater ✓✓A **OR** Underground water ✓✓A **OR** Borehole ✓✓A **(Accept any relevant answer.)**	2A answer (2)	M L4
		[35]	

QUESTION 5 [23 MARKS]

Ques.	Solution	Explanation	Level
5.1.1	Probability $= \frac{2}{6}$ ✓A ✓A $\times 100\%$ $= 33{,}33\%$ ✓CA **(Accept 33,3% OR 33,333%)**	1A numerator 1A denominator 1CA % **(NPR)** (3)	P L2
5.1.2	Actual distance = 815,6 km – 144,9 km ✓M = 670,7 km ∴ 670,7 × 1 000 ✓C = 670 700 m ✓CA	1M subtract correct values 1C conversion 1CA answer (3)	MP L2
5.1.3	Map distance $= \frac{81\,560\,000}{9\,600\,000}$ ✓MA = 8,4958… ✓CA ≈ 8,5 cm ✓R	1MA dividing correct values 1CA answer 1R one decimal place (3)	MP L2
5.1.4	Speed $= \frac{\text{Distance}}{\text{Time}}$ ✓SF 80 km/h = 815,6 km ÷ Time Time $= \frac{815{,}6\text{ km}}{80\text{ km/h}}$ ✓M = 10,195h = 10 hours 11 minutes 42 seconds ✓CA ∴ Time bus travelled = 10:11:42 ✓M ✓A $= \underline{01:45:00}$ $= \underline{08:26:42}$ = 8 hours 26 minutes 42 seconds ✓CA **(Accept 8h 26 min OR 8h 27 min)**	1SF substitution 1M changing subject 1CA time in hours and minutes 1A Total time for stopovers (1h 45 min) 1M subtract time 1CA time bus travelled **NPR** (6)	MP L3
5.2.1	The space left allow for movement of the fluid during temperature change or transportation of the bottles. ✓✓O **(Accept any other relevant response.)**	2O opinion (2)	M L4
5.2.2	Number of rectangular bottles in box $= \frac{3}{5} \times 75$ ✓MA = 45 ✓A ∴ Probability $= \frac{45}{75}$ ✓CA	1MA multiply correct fraction with 75 1A number of rectangular bottles 1CA correct probability (3)	P L2

5.2.3	Volume $= 3,142 \times \text{radius}^2 \times \text{height}$ $= 3,142 \times 4^2 \times 5$ ✓SF $= 251,36\ m^3$ $\approx 251\ m^3$ ✓CA ∴ Pam's statement is invalid ✓O	1SF substitution 1CA volume 1O opinion (3)	M L4
		[23]	
		TOTAL: 150	