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education

Department of Education
FREE STATE PROVINCE

MID-YEAR EXAMINATION

GRADE 12

MATHEMATICAL LITERACY P2



JUNE 2023

MARKS: 100

TIME: 2 HOURS

This question paper consists of 09 pages and an addendum with 3 ANNEXURES.

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INSTRUCTIONS AND INFORMATION

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

2. The ANNEXURE pages are provided in the ADDENDUM. Use it to answer the relevant questions.
   - ANNEXURE A is for QUESTION 1.1
   - ANNEXURE B is for QUESTION 2.
   - ANNEXURE C is for QUESTION 4.

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

4. An approved calculator (non-programmable and non-graphical) may be used unless stated otherwise.

5. Show ALL calculations clearly.

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

7. Indicate units of measurement, where applicable.

8. Start EACH question on a NEW page.

9. Write neatly and legibly.

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QUESTION 1

1.1 Reamorata is a student at Nelson Mandela Metropolitan University (NMMU) Vista Campus in Port Elizabeth. ANNEXURE A shows a map/plan of the layout of the campus where he attends classes.

Use ANNEXURE A to answer the questions that follow.

1.1.1 Identify the type of map/plan used and write it down. (2)

1.1.2 Give one purpose of the building marked as number 15. (2)

1.1.3 Name the province where Port Elizabeth is situated. (2)

1.1.4 What symbol is used to show parking on the campus? (2)

1.1.5 How many lecture halls are shown on the map/plan. (2)

1.2 In picture 1 and picture 2 two clocks are shown.

PICTURE 1	PICTURE 2
	

Use the information above to answer the questions that follow.

1.2.1 Name the two time formats used to display the time on the clocks. (2)

1.2.2 Write down, in words, the time displayed on the clock in picture 2. (2)

1.2.3 Convert 13 hours 57 minutes to hours. (2)

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1.3 The picture below shows a standard 330mℓ can of cooldrink with dimensions used in South Africa.

PICTURE OF A 330 mℓ CAN	DIMENSIONS OF THE CAN
	Diameter = 6,6 cm Height = 11,5 cm π = 3,142

Use the information above to answer the questions that follow.

1.3.1 Define the term diameter according to the given context. (2)

1.3.2 State which formulae (A, B or C) below can be used to calculate the circumference of the circular bottom of the given can.

A. Circumference = $\pi \times \text{radius}^2$

B. Circumference = $2 \times \pi \times \text{radius}$

C. Circumference = $2\times \pi \times \text{radius}^2$ (2)

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QUESTION 2

Study the map of South Africa on **ANNEXURE B** and answer the questions that follow.

2.1 Name the two towns on the Garden Route nearest to Cape town. (4)

2.2 Determine the probability of finding a coastal town in the North West province. Write your answer as a percentage. (2)

2.3 State the number of provinces in South Africa. (2)

2.4 Identify the scale that is used on the map. (2)

2.5 Jenny states that the most eastern town in the Free State on the map is Bethlehem. Is Jenny correct? Give a reason for your answer. (3)

2.6 Write down the given scale on the map of South Africa in the form 1: ……. (5)

2.7 Give the general direction of Bloemfontein to Cape Town. (2)

2.8 Identify a neighbouring country of South Africa where all the borders are provinces of South Africa. (2)

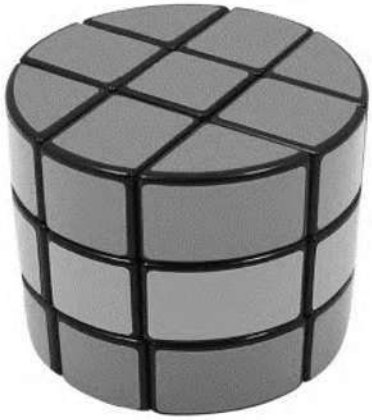
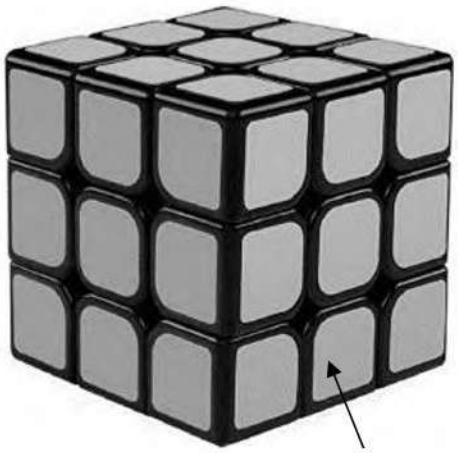
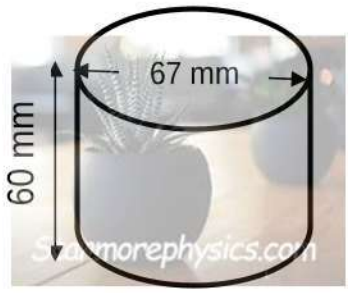
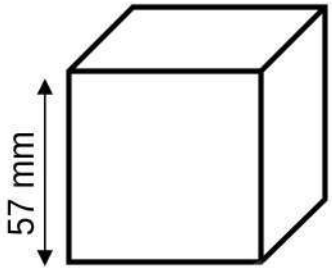
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QUESTION 3

3.1 Jessamé's mom Ms Kasselman bought her two Rubik's puzzles. The one Rubik's puzzle has a cylindrical shape while the other one has a cubical shape.

The dimensions and the shape of the two Rubik's puzzles are shown below.

RUBIK'S CYLINDER	RUBIK'S CUBE
	
Dimensions of Rubik's cylinder	**Dimensions of Rubik's cube**
 **Diameter = 67 mm** **Height = 60mm**	 **Side = 57 mm**

[Source: www.google.com]

Use the information above to answer the questions that follow.

3.1.1 On each of the square faces of the Rubik's cube are 9 coloured stickers. How many stickers are on the whole Rubik's cube? (2)

3.1.2 Calculate the perimeter of the square face of Rubik's cube.

You may use this formula: **Perimeter = Side + Side + Side + Side**

(2)

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3.1.3 Ms Kasselman states that the volume of the Rubik's cylinder is 211,56657 cm^3. Verify, showing ALL calculations, whether her statement is CORRECT.

You may use this formula:
Volume of the cylinder = 3,142 × radius² × height (5)

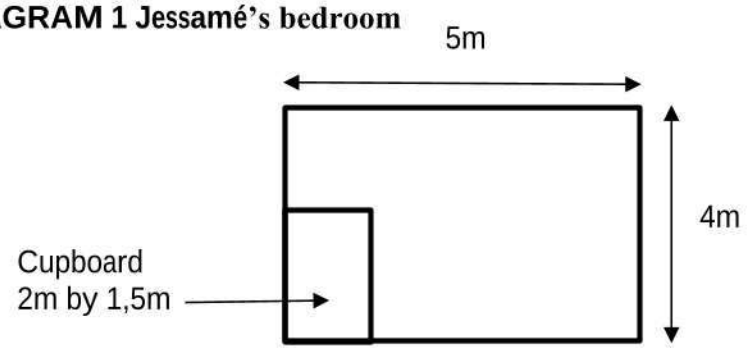
3.1.4 Calculate the total surface area of the Rubik's cube.

You may use this formula: **Total surface area of the cube = 6 (Side × Side)** (3)

3.2 Ms Kasselman decided to take out the carpet in Jessamé's bedroom and replace it with ceramic tiles. The room has an immovable cupboard. The cupboard will not be tiled inside.

The dimensions of Jessamé's bedroom are 4 m by 5 m and for the immovable cupboard it is 2 m by 1,5 m.

DIAGRAM 1 Jessamé's bedroom



Information:

- She intends using ceramic tiles that are 60 cm by 60 cm.
- There are 4 tiles in one box.
- The price of 1 box of tiles are R199,90.

Use the information above to answer the questions that follow.

3.2.1 Show that the total floor area to be tiled is 17 m^2.

You may use: **Area of a rectangle = length × breadth** (4)

3.2.2 Determine how many boxes of tiles Ms Kasselman will need if an extra 10 % of the number of tiles must be added for cutting of tiles and breakages. (9)

3.2.3 Determine the cost to buy the tiles. (2)
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QUESTION 4

4.1 Rethabile studied a strip chart connecting Durban with Port Elizabeth (lately known as Gqeberha).

On ANNEXURE C is a strip chart showing the road distance in kilometres from Durban to Port Elizabeth.

Use ANNEXURE C to answer the questions that follow.

4.1.1 How many National Roads are on the strip chart? (2)

4.1.2 State one difference between a strip chart and a normal road map. (2)

4.1.3 Determine the distance between Port Elizabeth and Pietermaritzburg. (3)

4.1.4 Write down the probability, as a percentage of randomly selecting Addo Elephant NP from the places of interest on the strip chart. (3)

4.1.5 What is the name of the town nearest to the place where the R63 crosses the N6? (2)

4.2 Rethabile is a student at Durban Westville University. She decided to drive from Durban to Port Elizabeth to visit her brother Reamorata.

- On her way Rethabile stopped at Port Shepstone for 30 minutes to stretch her legs.
- Her next stop was at Umtata for 45 min to have lunch.
- Then later she stopped at King William's town for 25 minutes.
- The trip from Durban to Port Elizabeth took her 11 hours 35 minutes in total.

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Rethabile stated that she did not exceed on average the maximum speed limit of 120km/h on national roads.

Verify, with calculations, whether Rethabile's statement is CORRECT.

You may use this formula: **Distance = speed × time** (8)

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4.3 The fuel consumption of Rethabile's car is 7,9 ℓ/100 km.

Use the information above to answer the questions that follow.

4.3.1 Calculate the total litres of fuel to be used from Durban to Port Elizabeth. Give your answer rounder to one decimal place. (3)

4.3.2 Determine (rounded to the nearest thousand) the cost of petrol to drive from Durban to Nelson Mandela Metropolitan University Vista Campus, if the petrol price is R22,95 per litre. (3)

4.4 Rethabile states that the distance from Durban to Port Shepstone using the N2 is 15 km longer than the distance from Port Shepstone to Port St. Johns using the R61. Is Rethabile correct? Do calculations to verify your answer. (5)

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ADDENDUM

This addendum consists of 4 pages with 3 annexures.

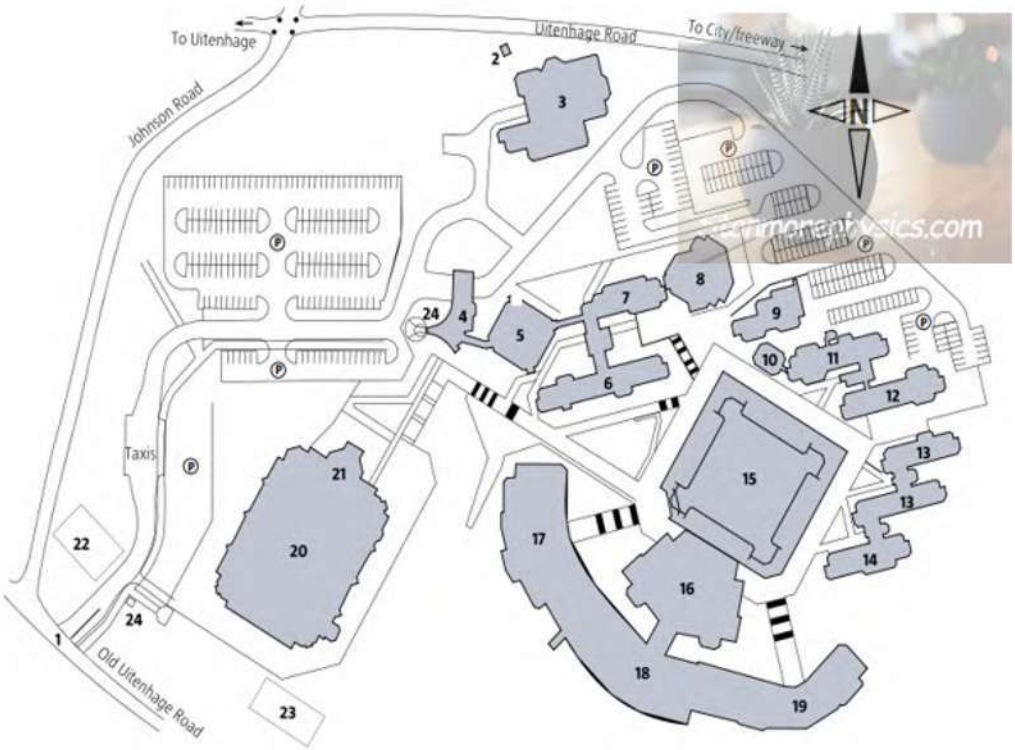
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ANNEXURE A

QUESTION 1.1

LAYOUT PLAN OF THE NELSON MANDELA METROPOLITAN UNIVERSITY VISTA CAMPUS IN PORT ELIZABETH (EASTERN CAPE)



Key

Ⓟ Parking

1. Entrance
2. Weather Station
3. Technical Services
4. Main entrance & Clinic
5. Registration
6. Academic Offices
7. Administration
8. Conference Hall
9. Psychology centre
10. Chemical store
11. Chemistry
12. Physics
13. Education
14. Geography
15. Library
16. Study centre
17. Lecture Hall A
18. Lecture Hall B
19. Lecture Hall C
20. Yebo Gogo NMMU indoor Centre
21. Cafeteria
22. Cricket Nets
23. Sports Field
24. Security

[Adapted from NMMU VISTA Campus map.indd]

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ANNEXURE B

QUESTION 2

MAP OF SOUTH AFRICA



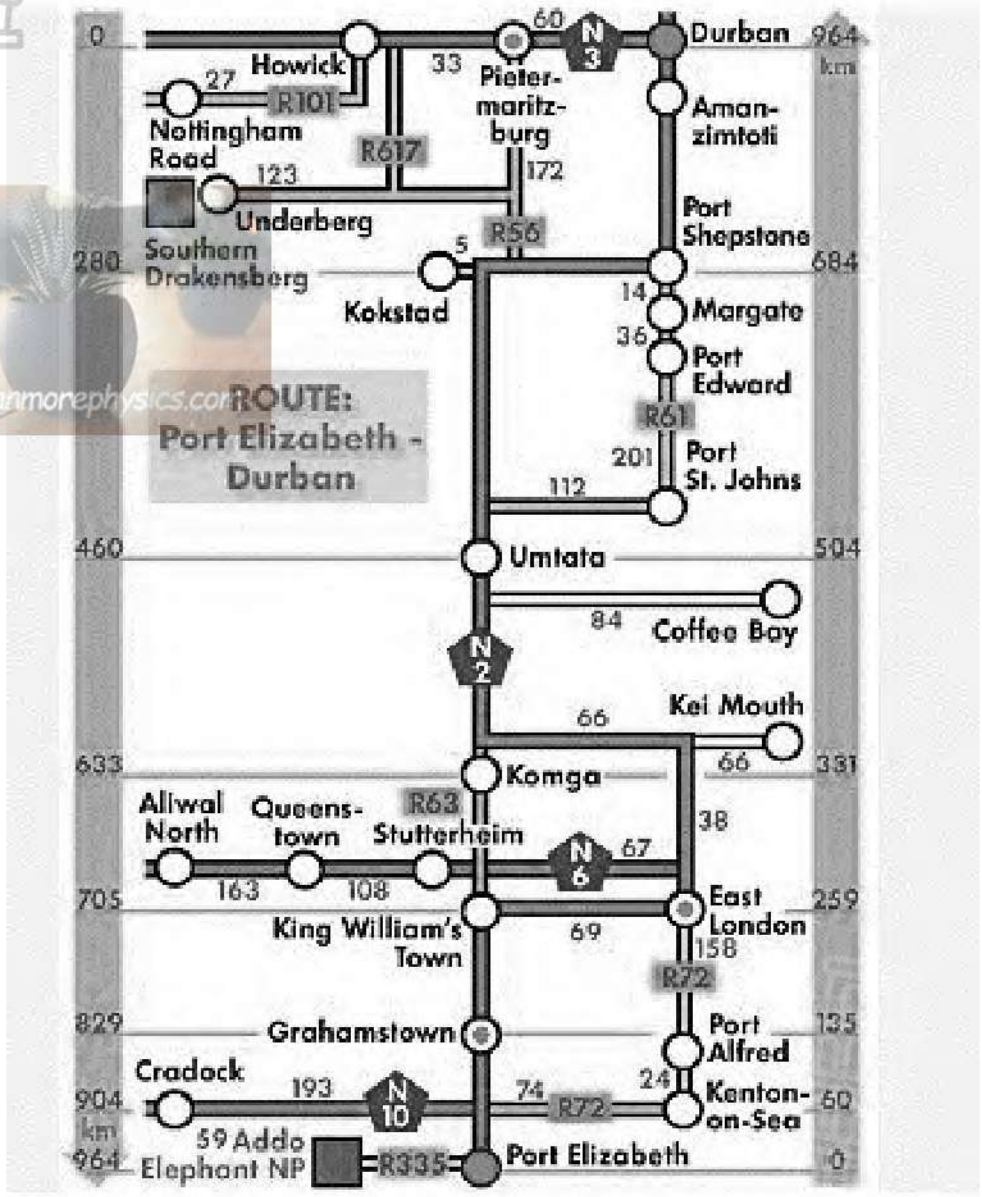
[source: www.sa-venues.com maps]

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ANNEXURE C

QUESTION 4

STRIP CHART WITH ROAD DISTANCES IN KILOMETRES (km) FROM DURBAN TO PORT ELIZABETH (GQEBERHA)



[Source: www.google.com]

KEY

Symbol		Description
N		National road
R		Regional road
		Places of interest

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MATHEMATICAL LITERACY P2

MARKING GUIDELINE

JUNE 2023

MARKS: 100

Symbol/*Simbool*	**Explanation/*Verduideliking***
M	Method/*Metode*
M/A	Method with accuracy/*Metode van akkuraatheid*
CA	Consistent accuracy/*Volgehoue akkuraatheid*
A	Accuracy/*Akkuraatheid*
C	Conversion/*Herleiding*
S	Simplification/*Vereenvoudiging*
RT	Reading from a table/graph/diagram/*Lees vanaf tabel/grafiek/diagram*
SF	Correct substitution in a formula/*Korrekte vervanging in formule*
O	Opinion/Example/Definition/Explanation/*Opinie/Voorbeeld/Definisie/Verduideliking*
P	Penalty, e.g., for no units, incorrect rounding off, etc./*Penalisasie, bv. vir geen eenhede/verkeerde afronding ens.*
R	Rounding off/*afronding*
NPR	No penalty for correct rounding/*Geen penalisering vir korrekte afronding nie*
NPU	No penalty for the units/*Geen penalisering vir eenhede nie*
AO	Answer only, if correct, full marks/*Slegs antwoord, indien korrek, volpunte*
MCA	Method with consistent accuracy/*Metode met volgehoue akkuraatheid*

This marking guideline consists of 13 pages

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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 item presented.
- Rounding is an independent mark.
- General principal of marking: If the candidate makes one mistake, he/she loses one mark.
- A conclusion mark can only be given if relevant calculations precede it.

QUESTION 1 [20MARKS]		**ANSWER ONLY FULL MARKS**	
	Solution	**Explanation**	**T/L**
1.1.1	Layout Plan	2A correct map/plan	MP L1 E
1.1.2	To borrow/return books✓✓O **OR** To read books✓✓O **OR** To study/use the internet/to do research✓✓O **OR** To access the computer ✓✓O **Any acceptable answer – must be related to library**	2A correct purpose (2)	MP L1 M
1.1.3	Eastern Cape/EC ✓✓A	2A correct province (2)	MP L1 E
1.1.4	**P** ✓✓A **Accept** P	2A correct symbol (2)	MP L1 E
1.1.5	3/Three✓✓A	2A correct number (2)	MP L1 E

	Solution	Explanation	T/L
1.2.1	Picture 1 = 12- hour ✓ A Picture 2 = 24- hour ✓A **Accept** Picture 1 = Analogue ✓ A Picture 2 = Digital✓ A	1A 1st format 1A 2nd format (2)	M L1 E
1.2.2	✓A ✓A Sixteen minutes to six in the morning. **Accept** ✓A ✓A Forty-four minutes past five in the morning.	1A correct time 1A in the morning (2)	M L1 E
1.2.3	Time in hours = $13h + \frac{57}{60}$ ✓A $= 13h + 0{,}95h$ $= 13{,}95h$ ✓A	1C dividing by 60 1A correct hours	M L1 M
1.3.1	The line that divides the circular bottom of the can into two equal parts.✓✓O **OR** A straight line passing from one side to the other side through the centre of the can. ✓✓O	2O correct explanation	M L1 E
1.3.2	B/ Circumference = 2 × π × radius✓✓O	2A correct formulae (2)	

QUESTION 2 [22 MARKS]			
Item	**Solution**	**Explanation**	**T/L**
2.1	Oudtshoorn ✓✓O Mossel Bay ✓✓O	2A first town 2A second town (4)	MP L1 M
2.2	0% ✓✓A **0 only (1 mark)**	2A correct percentage (2)	MP L2 E
2.3	9/Nine✓✓A	2A correct number (2)	MP L1 E
2.4	Bar/Line/Linear scale/graphic scale✓✓A	2A correct scale (2)	MP L1 E
2.5	Jenny is not correct ✓O The most eastern town is Harrismith ✓✓O	1O opinion 2o correct reason (3)	MP L4 E
2.6	Bar scale distance = 20mm ✓A 20 mm = 300 km ✓MCA 20mm = 300 × 1 000 000✓C 1mm = $\frac{300\ 000\ 000}{20}$ = 15 000 000✓S Scale is 1: 15 000 000✓CA	1A correct measurement 1MCA concept of scale in the correct order 1C converting km to mm 1S correct simplification 1CA scale/format (5)	MP L3 M

2.6	**OR** Bar scale distance = 2cm✓A 2 cm = 300 km ✓MCA 2 cm = 300 × 100 000✓C 1mm = $\frac{30\ 000\ 000}{2}$ = 15 000 000✓S Scale is 1: 15 000 000✓CA **NB: Check if learners are working with 100 km or 50km for full marks.**	1A correct measurement 1MCA correct concept of scale in the correct order 1C converting km to cm 1S correct simplification 1CA scale/format (5)	
2.7	Southwest / SW ✓✓A	2A correct direction (2)	MP L2 M
2.8	Lesotho ✓✓A	2A correct country (2)	MP L2 E

QUESTION 3 [27 MARKS]			
Item	**Solution**	**Explanation**	**T/L**
3.1.1	Number of stickers = 6 × 9 ✓MA = 54 ✓A	1MA multiplying correct values 1A correct answer **AO** (2)	M L2 E
3.1.2	Perimeter = S + S + S + S = 57mm + 57mm + 57mm + 57mm ✓SF = 228 mm✓A **OR** Perimeter = 4 S = 4 × 57mm✓SF = 228 mm✓A	1SF correct substitution 1A simplification **OR** 1SF correct substitution 1A simplification **NPU** **AO** (2)	M L2 E
3.1.3	Radius = $\frac{67\ mm}{2}$ = 33,5 mm✓A = 3,35 cm✓C Height = $\frac{60}{10}$ = 6 cm✓C Volume of the cylinder = 3,142 × r^2 × h ✓SF = 3,142 × 3,35 cm^2 × 6 cm = 211, 56657 cm^3 Her statement is correct. ✓O	1A calculating the radius 1C converting radius 1C converting height 1SF substitution 1O opinion	M L4 D

	OR Radius = $\frac{6{,}7\text{ cm}}{2}$ ✓C = 3,35 cm✓A Height = $\frac{60}{10}$ = 6 cm ✓C Volume of the cylinder = 3,142 × r^2 × h ✓SF = 3,142 × 3,35 cm^2 × 6 cm = 211, 56657 cm^3 Her statement is correct. ✓O **OR** Radius = $\frac{67\text{ mm}}{2}$ = 33,5 mm✓A Volume of the cylinder = 3,142 × r^2 × h ✓SF = 3,142 × 33,5 mm^2 × 60 mm ✓CA = 211 566,57 ÷ 1 000 ✓C = 211,56657 Her statement is correct.✓O	**OR** 1C converting radius 1A calculating radius 1C converting height 1SF substitution 1O opinion 1A calculating radius 1SF substitution 1CA simplification 1C conversion 1O conclusion (5)	

3.1.4	Total surface area of the square = 6 (S × S) ✓SF = 6 (57 mm × 57 mm) ✓CA =19 494 mm^2✓U **OR** Total surface area of the square = 6 S^2 = 6 × (57 mm)^2 ✓SF ✓CA =19 494 mm^2 ✓U	1SF correct substitution 1CA simplification 1U correct units **OR** 1SF correct substitution 1CA simplification 1U correct units (3)	M L2 M
3.2.1	Area a bedroom = length × breadth = 5 m × 4 m✓SF = 20 m^2✓A Area of the cupboard = length × breadth = 2 m × 1,5 m = 3 m^2 ✓A Area to be tiled = 20 m^2 - 3 m^2✓MA = 17 m^2	1SF correct substitution 1A correct area 1A correct area 1MCA subtracting areas (4)	M L3 M

3.2.2	Area of a tile = 60 cm × 60 cm✓SF = 3 600 cm^2 = $\frac{3\ 600}{10\ 000}$ ✓C = 0,36 m^2 ✓CA Number of tiles = $\frac{17}{0,36}$ ✓MCA = 47,22222222 ✓CA Number of extra tiles = 47,22222222 × 10% ✓MCA = 4,722222222 Total number of tiles needed = 47,22222222 + 4,722222222 = 51, 94444444✓CA Number of boxes needed = $\frac{51,94444444}{4}$ ✓MCA = 12, 98611111 ≈ 13 boxes ✓CA	1 SF substitution 1C converting. 1CA simplification 1MCA dividing converted areas. 1CA simplification 1MCA calculation 10% 1CA simplification 1MCA dividing by 4 1CA rounding up. NP for early rounding (9)	M L3 D
3.2.3	Cost to buy tiles = 13 × R199,90 ✓MCA = R2 598,70 ✓CA	**CA from 3.2.2** 1MCA calculating cost 1CA final answer (2)	M/F L2 E

QUESTION 4 [31 MARKS]			
Item	**Solution**	**Explanation**	**T/L**
4.1.1	4/Four ✓✓A	2A correct number (2)	MP L1 E
4.1.2	A strip chart is not drawn to scale while a road map is drawn to scale. ✓✓A **OR** A strip chart shows the routes as straight line while a road map shows the routes in the winding manner. ✓✓A	2A explanation (2)	MP L1 M
4.1.3	Distance between Port Elizabeth and Pietermaritzburg ✓RT = 964 + 60 ✓MA = 1024 km✓CA	1RT both correct values 1 MA adding correct values. 1CA total kilometres **AO** (3)	MP L2 M
4.1.4	Probability = $\frac{1}{2}$ ✓A × 100 ✓A = 50 % ✓CA	1A numerator 1A denominator 1CA simplified as % **AO** (3)	P L2 M
4.1.5	Stutterheim ✓✓A	2A correct town (2)	MP L2 E

4.2	Stopping time = 30min +45 min + 25 min = 100 min ✓A $= \frac{100}{60}$ = 1 hr 40 min ✓C Travelling time = 11hrs 35 min – 1hr 40 min = 9 hrs 55 min✓CA = 9 hrs + $\frac{55}{60}$ ≈ 9,916666667 hrs✓C Distance = speed × time 964 km = speed × 9,916666667 hrs✓SF Speed = $\frac{964\text{ km}}{9{,}916666667\text{ hrs}}$ ✓S = 97,21 km/h✓CA She is correct. She drove on average less than the national road speed limit of 120 km/h ✓O **OR** Stopping time = 30min +45 min + 25 min = 100 min ✓A Travelling time = 11hrs 35 min – 100 min ✓C = [(11× 60) + 35 min] – 100 min = 595 min✓CA Distance = speed × time 964 km = speed × 595 min✓SF	1A total stopping time. 1C convert to hours. 1CA travelling time. 1C conversion 1SF substitute into formula 1S change of subject of the formula. 1CA simplification 1O verification **OR** 1A total stopping time 1C convert to minutes 1CA travelling time 1SF substitute into formuila	M L4 D

	Speed = $\frac{964\text{ km}}{595\text{ min}}$ ✓S = 1,620168067 km/min = 1,620168067 × 60 min✓C = 97,21 km/h ✓CA She is correct. She drove less than national road speed limit 120 km/h ✓O	1S change of subject of the formula 1C conversion 1CA simplification 1O verification **NPR** (8)	
4.3.1	Fuel Consumption $= \frac{7{,}9\ell/\text{km}}{100\text{km}} \times 964\text{km}$ ✓MA $= 76{,}156\ell$ ✓CA $\approx 76{,}2\ell$ ✓R	1MA multiplying by 964 km 1CA Simplification 1R correct rounding (3)	M L2 M
4.3.2	Petrol cost = $76{,}2\ell \times$ R 22,95 ✓MCA = R1 748,79 ✓CA ≈ R2 000,00 ✓R	**CA from Question 4.3.1** 1MCA multiplying by fuel consumption. 1CA Simplification 1R rounding (3)	M/F L2 M
4.4	From Durban to Port Shepstone using N2 = 280 km ✓RT From Port Shepstone to Port St Johns using R61: ✓MA 14km +36km + 201 km = 251 km✓CA 280 km – 251 km = 29 km ✓CA Rethabile is not correct✓O	1RT 280 km 1MA adding all three correct values 1CA simplify 1CA subtract and answer 1O correct opinion (5)	L4 MP M

MATHEMATICAL LITERACY P2 ANALYSIS GRID JUNE 2023

	L1	**L2**	**L3**	L4	MP	**M**	**P**	**E**	**M**	**D**
1.1.1	2				2			2		
1.1.2	2				2			2		
1.1.3	2				2			2		
1.1.4	2				2			2		
1.1.5	2				2				2	
1.2.1	2					2		2		
1.2.2	2					2		2		
1.2.3	2					2			2	
1.3.1	2					2		2		
1.3.2	2					2		2		
2.1	4				4			4		
2.2		2					2	2		
2.3	2				2			2		
2.4	2				2			2		
2.5				3	3			3		
2.6			5		5				5	
2.7		2			2				2	
2.8		2			2			2		
3.1.1		2				2			2	
3.1.2		2				2		2		
3.1.3				5		5			5	
3.1.4		3				3			3	
3.2.1			4			4			4	
3.2.2			9			9				9
3.2.3		2				2		2		
4.1.1	2				2			2		
4.1.2	2				2				2	
4.1.3		3				3			2	
4.1.4		3					3		2	
4.1.5		2			2			2		
4.2				8		8				8
4.3.1		3				3			3	
4.3.2		3				3			3	
4.4				5	5				5	
	32	29	18	21	41	54	5	39	42	17
Target	**30**	**30**	**20**	**20**	**40**	**55**	**5**	**40**	**40**	**20**

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