KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

PREPARATORY EXAMINATION

SEPTEMBER 2024

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages and
an Addendum with 3 Annexures.

INSTRUCTIONS AND INFORMATION

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

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

        •   ANNEXURE A for QUESTION 2.3.1
        •   ANNEXURE B for QUESTION 2.3.2 and 2.3.3
        •   ANNEXURE C for QUESTION 4.2

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

4.   Start EACH question on a NEW page.

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

6.   Show ALL calculations clearly.

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

8.   Indicate units of measurement, where applicable.

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

10.   Write neatly and legibly.

QUESTION 1

1.1

The instruments shown below measure time, speed, and temperature.

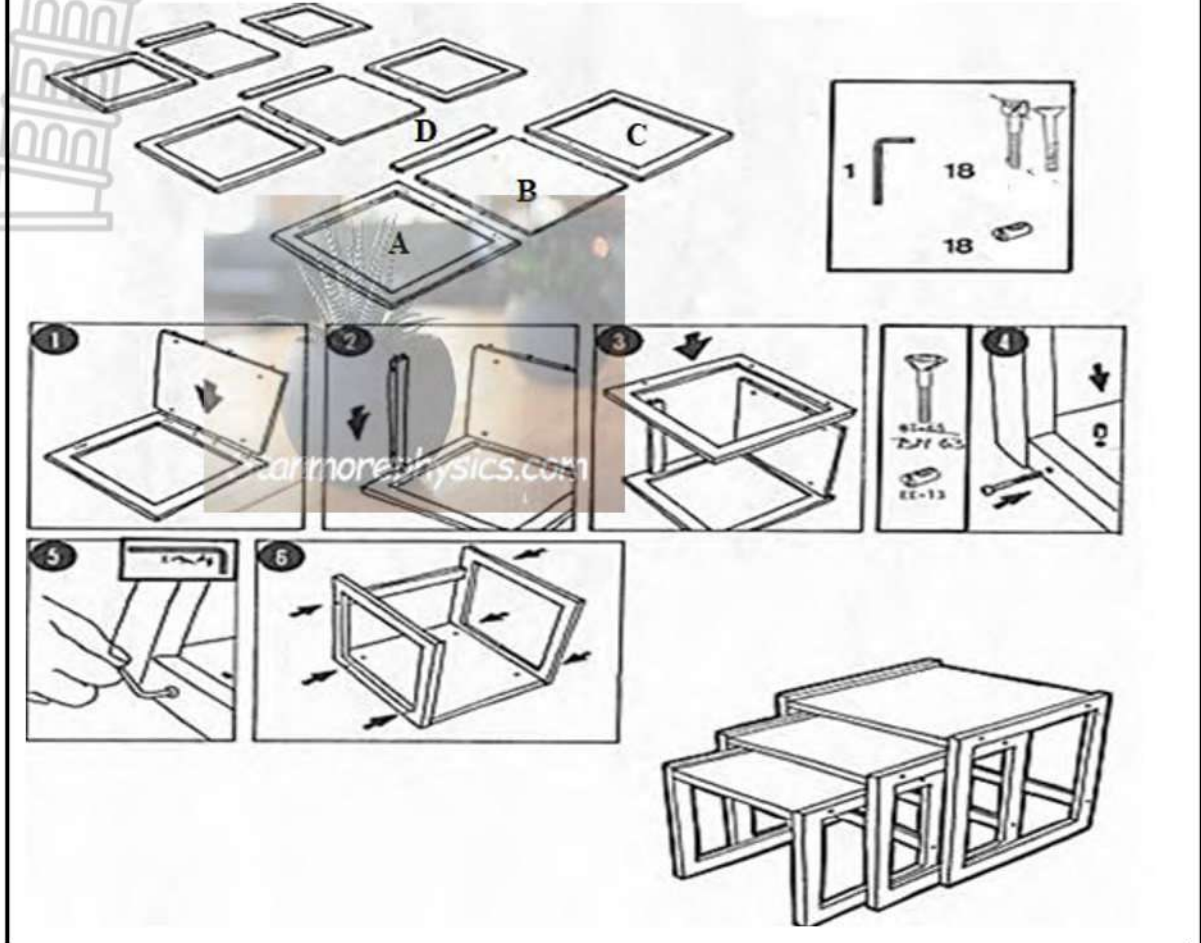

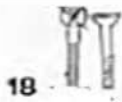Use the information above to answer the following questions.

1.1.1   Identify the two different types of clocks represented above.   (2)

1.1.2   Name the notation that can be used to differentiate the time of day on a 12-hour digital clock.   (2)

1.1.3   Write the time in the evening on clock C in 24-hour time format.   (2)

1.1.4   Identify the speed in miles/hour that is seen on the speedometer.   (2)

1.1.5   Write the temperature of 20^0C in ^{0}F.   (2)

1.2　An assembly plan for a set of side tables can be seen below. This assembly plan has no instructions.

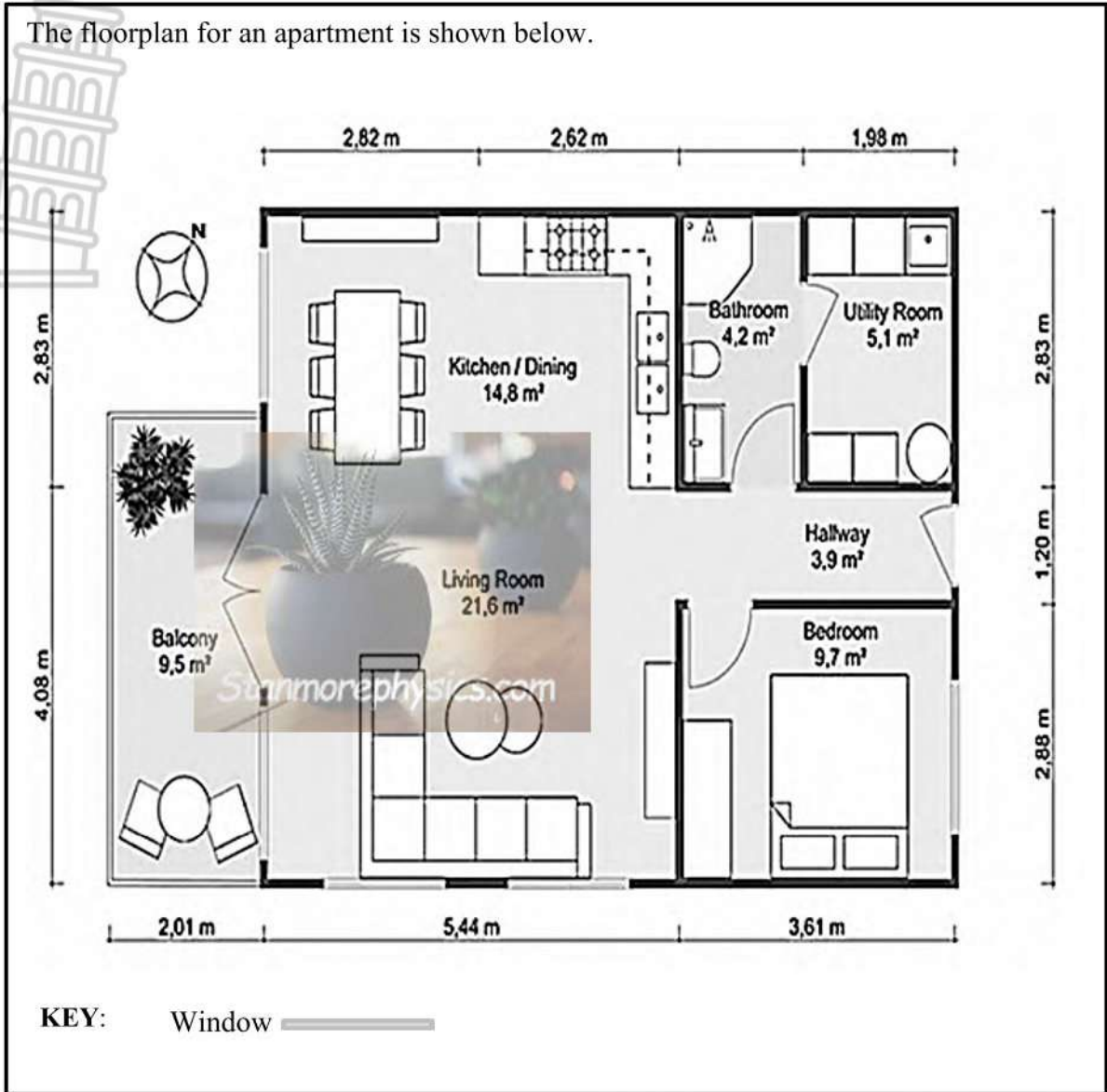| COMPONENTS USED TO ASSEMBLE THE TABLES		
1 ALLEN KEY	**18 BIG SCREWS**	**18 SMALL BOLTS**

[Adapted source: https://www.ikea.com]

Use the information above to answer the following questions.

1.2.1　Determine the total number of parts that must be used to make up all the tables. (3)

1.2.2　Identify the part of the table that will help to reinforce or support the table. (2)

1.2.3　Name the step of the assembly diagram which will secure the screws and small bolts. (2)

1.2.4　Write a set of instructions for Steps 1 to 3 of the assembly diagram. (3)

1.3   The floorplan for an apartment is shown below.

2,82 m   2,62 m   1,98 m

N

2,83 m

Kitchen / Dining
14,8 m²

Bathroom
4,2 m²

Utility Room
5,1 m²

2,83 m

Living Room
21,6 m²

Hallway
3,9 m²

1,20 m

Balcony
9,5 m²

Bedroom
9,7 m²

4,08 m

2,88 m

2,01 m   5,44 m   3,61 m

KEY: Window

[Adapted source:www.roomsketcher.com]

Use the information on the floor plan above to answer the following questions.

1.3.1   Write down the compass direction of the Bedroom from the Kitchen/Dining room.   (2)

1.3.2   Determine which rooms will receive the afternoon sun.   (2)

1.3.3   Calculate the width of the apartment.   (2)

1.3.4   Determine the number of windows in the apartment.   (2)

1.3.5   Identify a design error in this plan.   (2)

[30]

QUESTION 2

2.1 Shown below is the layout plan for a wedding venue. The venue has a reception area and a hall where the wedding takes place.
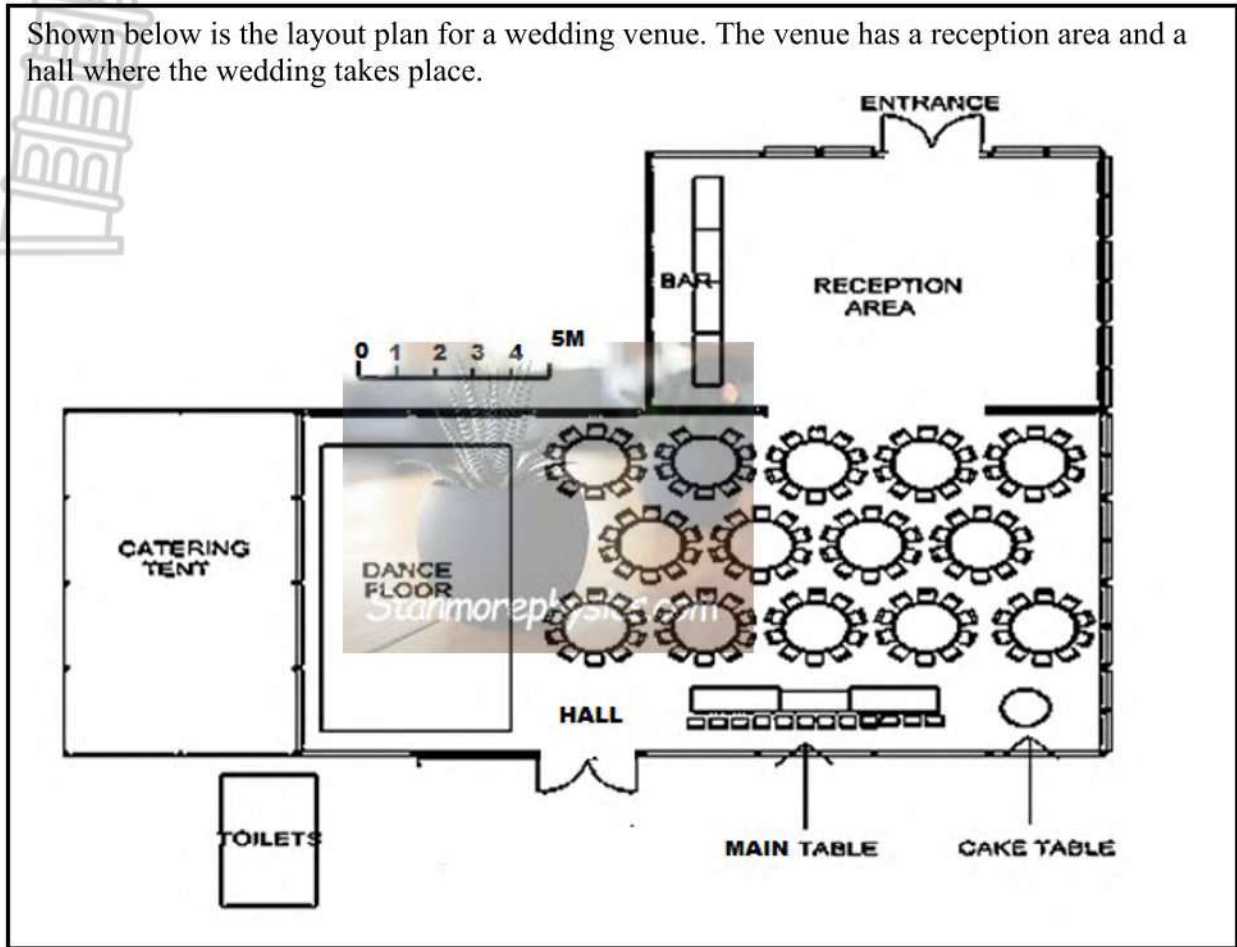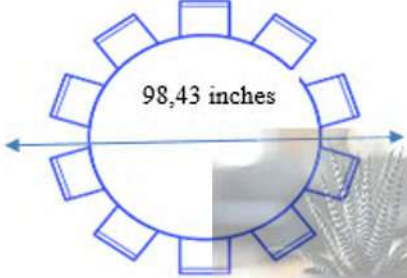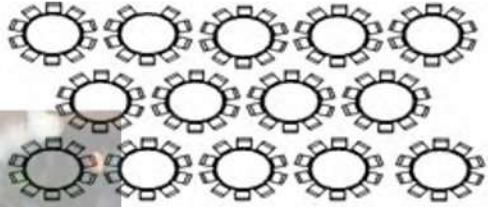

Use the layout plan above to answer the following questions.

2.1.1 Explain the term *layout plan* in the given context. (2)

2.1.2 Identify the type of scale seen on the layout plan. (2)

2.1.3 Measure the scale. (2)

2.1.4 Explain what this scale represents. (2)

2.1.5 Determine the total number of people the hall can seat. (3)

2.2 | The layout plan shows that the number of round tables that can fit in the seating area in the hall. A wedding planner wants to confirm that the seating area can accommodate all the tables shown below.

LENGTH OF TABLE INCLUDING CHAIRS AND SPACE AROUND TABLE	DIMENSIONS OF THE SEATING AREA
98,43 inches	
NOTE: 1 inch = 2,54 cm	LENGTH = 15 metres WIDTH = 7,5 metres

Use the information above to answer the following questions.

2.2.1   Determine the length of the table, including chairs, and the space around the table in metres.   (4)

2.2.2   Calculate the maximum number of tables that can fit in the seating area.   (5)

2.3 | A route map showing directions to the wedding venue at Langverwacht Farm is shown in ANNEXURE A and the weather forecast is shown in TABLE 1 in ANNEXURE B.

2.3.1   Give a guest travelling on the N1 Johannesburg directions to the wedding venue.   (4)

2.3.2   Determine the likelihood of it snowing.   (2)

2.3.3   Determine the probability, as a percentage, of it raining on Saturday, the day of the wedding.   (4)

[30]

QUESTION 3

3.1 The pool at school needs a pool cover. A pool cover prevents people falling into the pool and protects the pool. The diagram below shows the dimensions of the pool and the cover. The pool cover overlaps the pool by 1 metre all around.

DIMENSIONS OF THE POOL AND POOL COVER ARE IN METRES
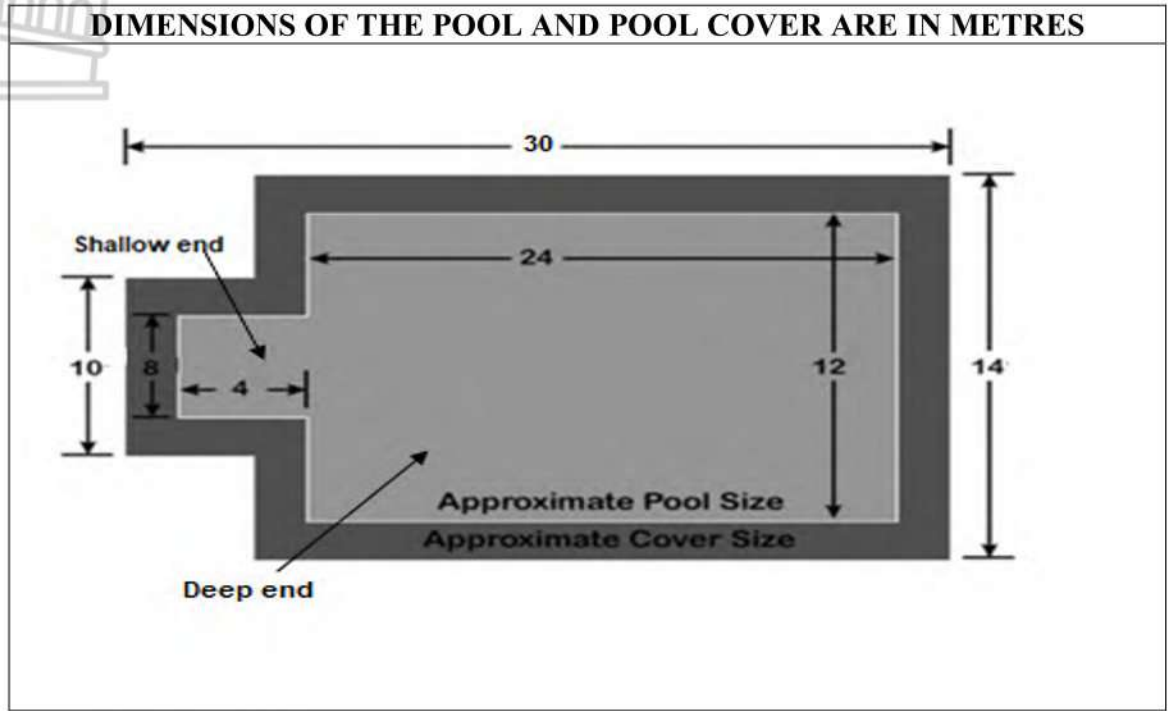
NOTE: 1m³ = 1000 Litres

[Adapted source:www.suntekpools.com]

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

3.1.1   Determine the perimeter of the pool cover.

You may use the formula:

Perimeter = 2 (L + B)   (3)

3.1.2   Determine how many times larger the area of the pool cover is compared to the area of the pool. Show all working.

You may use the formula:

Area = length × breadth   (8)

3.2

> The shallow end of the pool has a depth of 1m and the deep end has a depth of 2m.

     3.2.1   Determine the total capacity of the pool.

                  You may use the formula:

                  Volume = length × breadth × height   (4)

     3.2.2   Chlorine is a chemical that is used to prevent bacteria and algae from forming in the pool. For every 1000 litres of pool water 1,5 teaspoons of chlorine is required.

                  NOTE: 1 teaspoon = 5ml   (7)

                  Determine the number of litres of chlorine required to treat the pool.

3.3

> The pool needs to be refilled with water. An empty pool fills with water at a rate of 9 gallons per minute.

     3.3.1   Determine the number of litres of water per minute required to refill the pool.

                  NOTE: 1 gallon = 3,78541 litres.   (2)

     3.3.2   Determine the time taken, in days, to fill the pool. Round up your answer to   (6) the nearest day.

                                                                              [30]

QUESTION 4

4.1 | Siya makes fire pits for a living. A fire pit can be used for outdoor entertaining. The pit is made of metal.

SIDE VIEW OF THE FIRE PIT	TOP VIEW OF THE FIRE PIT
25 cm	metal border 114 cm 100 cm Stanmorephysics.com
Height of the fire pit = 25cm	**Inner diameter = 100cm**

[Adapted source www.amazon.com]

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

4.1.1 Determine the area of the metal border.

You may use the formula:

$$\text{Area of a circle} = 3{,}142 \times r^2 \qquad (4)$$

4.1.2 Siya claims he needs $1{,}99\text{m}^2$ of metal sheeting, including 10% for wastage, to make one fire pit.

Verify his **CLAIM** by showing all calculations.

You may use the formula:

$$\text{Surface Area of a Cylinder} = (2 \times 3{,}142 \times r^2) + (2 \times 3{,}142 \times r \times h) \qquad (8)$$

4.1.3 Siya wants to apply two coats of paint to the fire pit to rust proof it.
Determine the number of litres of paint he must buy, if one litre of paint covers 5m^2. (4)

4.2

> Siya sells the fire pits at a local market. His expenses for the month are as follows.
>
> - R800 to rent a stall at the market.
> - R650 for transportation.
> - The metal costs R530 to make 2 fire pits.
> - One litre of paints costs R199 for one fire pit.

Use ANNEXURE C to answer the following questions.

4.2.1   Write an equation to represent Siya's total expense for the month.

Total Expense =   (5)

4.2.2 (a)   Write down the break-even values.   (2)

4.2.2 (b)   Explain the meaning of the *break-even point* in this context.   (2)

4.2.3   A shop orders 15 fire pits. Siya thinks he will make approximately R20 000 in profit.

Verify this **CLAIM**, showing all calculations.   (5)

[30]

QUESTION 5

5.1

> Mia is travelling from Johannesburg Airport to Rome in Italy. Pilots measure distance in nautical miles. A nautical mile is a unit of length in air, marine and space travel.
>
> **NOTE: 1 nautical mile = 1,151 miles**
>
>   **1 km = 0,6215 miles**

Use the information above to answer the following questions.

5.1.1   Rome is 4 158 nautical miles away from Johannesburg. Calculate this
          distance in kilometres.   (4)

5.1.2   The flight time to Rome is 13 hours 10 minutes. Determine the speed in km
          per hour that the plane is travelling at.   (4)

5.1.3   Rome has an approximate population of 2,9 million that covers an area of
          1 285,3 km^2. Determine the number of people per km^2.   (2)

5.2

> A map of Italy and the Amalfi Coast is shown below. The map shows the train and flight route from Rome to Naples.

[Source: santorinidave.com]

Use the map above to answer the following questions.

5.2.1   Measure the distance from Rome to Naples on the map and calculate the actual
          distance using the given scale.   (5)

5.2.2   A single flight costs R2 697 and a high-speed train trip costs €52 to Naples.

          Mia claims that the cost of a train trip is a third of the price of flight ticket.

          Verify this **CLAIM** showing all calculations.

          NOTE: R1 = €0,049   (5)

5.2.3   Mia is travelling 60,9 km by car from Naples to Amalfi Coast. The car has a petrol consumption of 6,6 litres per 100 km. Petrol costs €1,865 per litre.

Determine the total cost of a return trip to Naples.   (6)

5.2.4   Mia states that if she leaves Rome by high-speed train at 13:45, she will reach Amalfi Coast by 7pm.

- Train trip is 75 minutes long
- Takes 45 minutes to collect a car at Naples train station
- Stops for 1 hour 15 minutes for supper
- Drive to Amalfi Coast takes 90 minutes

Verify showing all calculations if her statement is **CORRECT**.   (5)

[30]

TOTAL MARKS: 150

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ADDENDUM

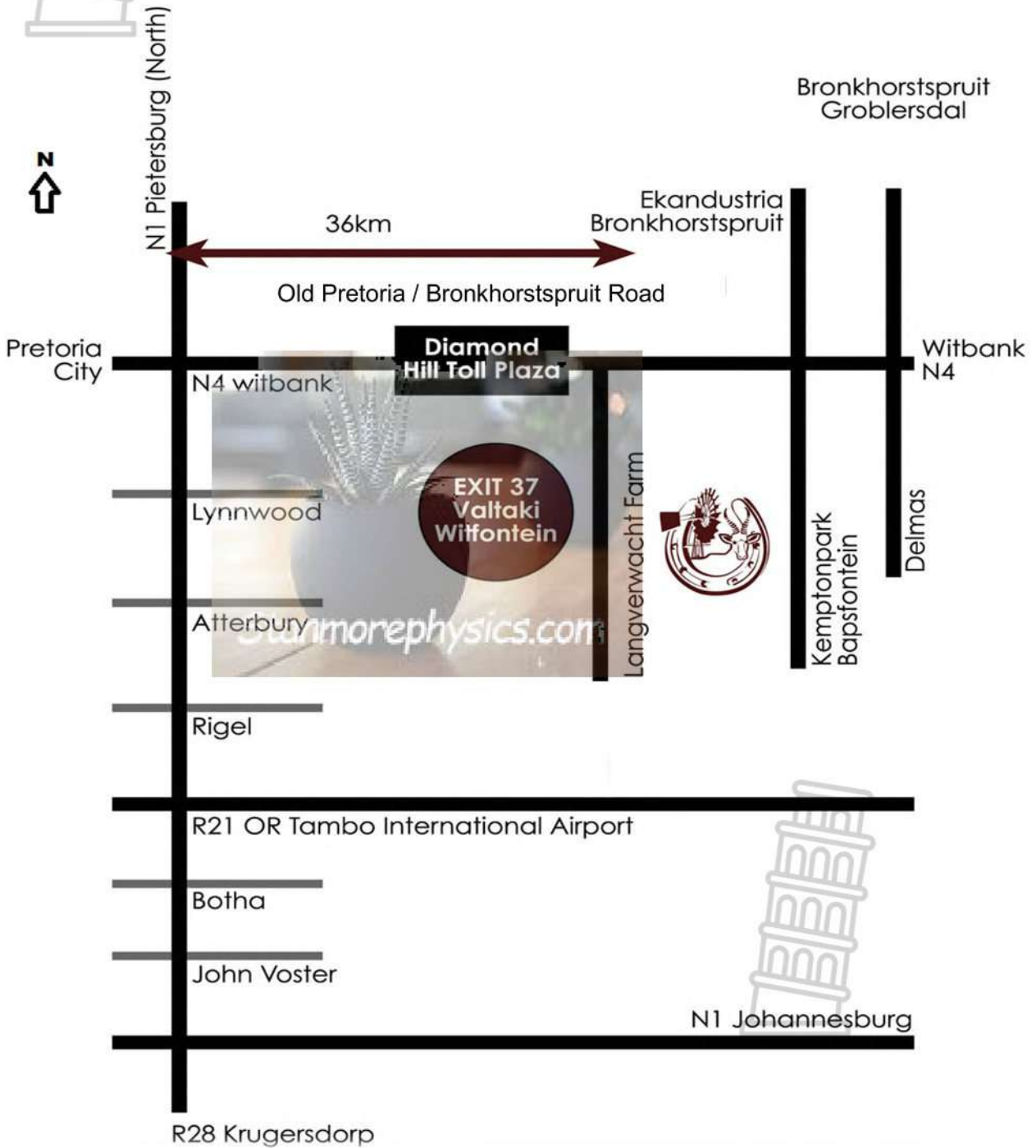**PREPARATORY EXAMINATIONS**

SEPTEMBER 2024

This Addendum consists of 4 pages with 3 Annexures.

ANNEXURE A

QUESTION 2.3.1

MAP SHOWING ROUTE TO THE WEDDING VENUE

[Adapted Source:www.langverwachtfarm.co.za]

ANNEXURE B

QUESTION 2.3.2 and 2.3.3

TABLE 1 SHOWING WEATHER FORECAST FROM 19 TO 21

°C	Thursday 19			Friday 20			Saturday 21		
°F	AM	PM	Night	AM	PM	Night	AM	PM	Night
km/h	10	20	10	5	15	5	25	15	5
	clear	clear	clear	clear	clear	clear	rain shwrs	rain shwrs	clear
💧mm	-	-	-	-	-	-	1	1	-
❄cm	-	-	-	-	-	-	-	-	-
max 🌡°C	21	21	20	28	29	27	23	30	19
min 🌡°C	19	21	18	21	26	20	19	19	18

[Source www.logdown.com]

ANNEXURE C

QUESTION 4.2
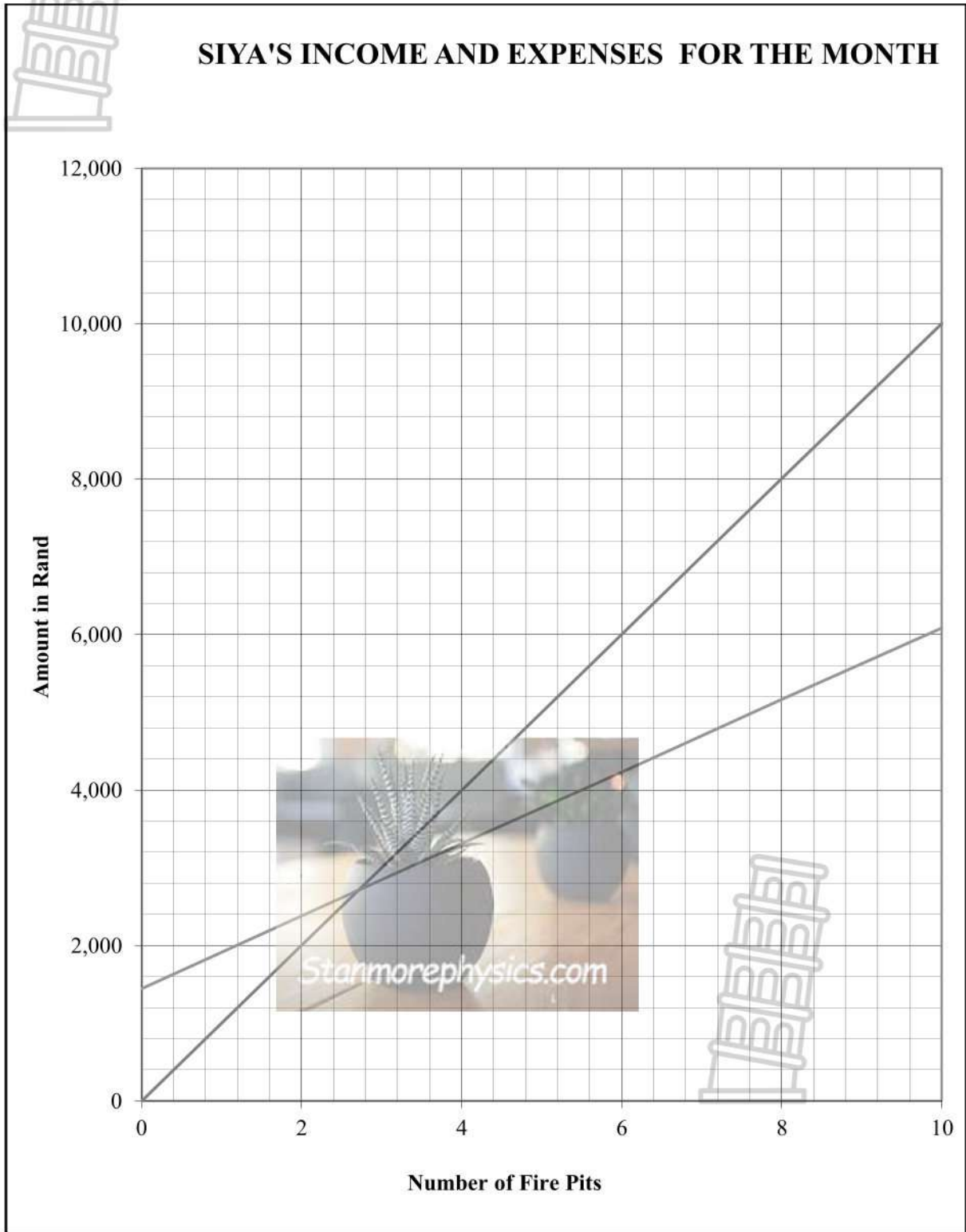
SIYA'S INCOME AND EXPENSES FOR THE MONTH

FINAL

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PREPARATORY EXAMINATION

SEPTEMBER 2024

MARKING GUIDELINE

MARKS: 150

SYMBOL	EXPLANATION
MA	Method with accuracy
MCA	Method with continued accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT	Reading from a table/ graph/ diagram/Map
SF	Correct substitution in a formula
O	Opinion/ reason/deduction/example/Explanation
P	Rounding off
F	deriving a formula
AO	Answer only full marks
NPU	Penalty e.g. for units, incorrect rounding off etc.
NPR	No penalty for rounding/units

This marking guideline consists of 10 pages.

QUESTION 1[30 MARKS]ANSWER ONLY FULL MARKS			
Quest.	**Solution**	**Explanation**	**T & L**
1.1.1	✓A ✓A Analogue and digital clocks	2A Correct answer (2)	M L1 E
1.1.2	✓A ✓A AM and PM time notation/format	2A Correct answer (2)	M L1 E
1.1.3	Time = 22:11 ✓✓RT	2RT correct format (2) **Accept: 22:12**	M L1 E
1.1.4	Speed = 75mi/h✓✓RT	2RT correct answer **Accept: 75** (2)	M L1 E
1.1.5	Temperature = 80 ^{0} F✓✓RT	2RT correct answer (2)	M L1 E
1.2.1	✓MA Total = (3 × 4) + 18 +18✓MA = 48✓CA	1MA Multiplying by 3 1MA adding correct values. 1CA answer (3)	MP L1 E
1.2.2	Part D ✓✓RT	2RT correct answer (2)	MP L1 E
1.2.3	Step 5✓✓RT	2RT correct answer (2)	MP L1 E
1.2.4	Step 1 Attach part B to A ✓RT Step 2 Attach part D to A ✓RT Step 3 Place part C onto B and D✓RT **OR** Step 1 Attach part B to C ✓RT Step 2 Attach part D to C ✓RT Step 3 Place part A onto B and D✓RT	3RT correct answer (3)	MP L1 E
1.3.1	East✓✓RT	2RT correct answer (2)	M L1 E
1.3.2	Kitchen/Dining room ✓✓RT	2RT correct answer (2)	M L1 E
1.3.3	Width = 2,88m + 1,20m + 2,83m✓MA = 6,91m✓A	1MA adding correct value 1A correct answer	M L1 E

	OR Width = 4,08 + 2,83✓MA = 6,91m✓A		
			(2)
1.3.4	5 windows✓✓RT	2RT correct answer (2)	M L1 E
1.3.5	No window in the bathroom or utility room. ✓✓RT **OR** Entrance to utility room is from the bathroom ✓✓RT **OR** Toilet is positioned on the inside wall. ✓✓RT	2RT correct answer (2)	M L1 E
			[30]

QUESTION 2 [30 MARKS]

Quest.	Solution	Explanation	T & L
2.1.1	A layout plan shows the top /aerial/birds eye view and the arrangement of the wedding venue ✓✓O	2O correct explanation (2)	MP L1 E
2.1.2	Line/Graphic scale✓✓A	2A correct answer (2)	MP L1 E
2.1.3	2,5cm ✓✓A **OR** 25mm✓✓A	2A measuring accurately **Accept 2,4 cm to 2,6cm** (2)	MP L1 E
2.1.4	2,5 cm on the plan represents 5m in reality✓✓O **OR** 25mm on the plan represents 5m in reality✓✓O	2O correct explanation (2)	MP L1 E
2.1.5	✓ MA Number of people = (13 × 10) + 9 + 12✔ MA = 151✔ CA	1MA multiplying 13 by 10 1MA adding 9 and 12 1CA answer (3)	MP L2 M

2.2.1	Length in cm = 98,43 ×2,54✓C
	
	     = 250,01cm✓A
	
	Length in m = 250,01 ÷ 100✓MCA
	     = 2,50m✓CA
		1C conversion
		
		1A answer
		
		1MCA dividing by 100
		
		1CA answer
		
		         (4)
			MP
			L2
			M

2.2.2	Along the length = 15 ÷ 2,50✓ MCA
	
	     = 6✓CA
	
	Along the width = 7,5 ÷ 2,50
	
	     = 3✓CA
	
	Number of tables = 6 × 3✓MCA
	
	     = 18 tables✓CA
		CA from Q2.2.1
		1MCA dividing by 2,50
		
		1CA answer
		
		1CA answer
		
		1MCA multiplying
		
		1CA answer
		         (5)
			MP
			L2
			M

2.3.1	Turn right and head north on R28 Krugersdorp and travel towards Pretoria City✓A Turn right onto N4 Witbank✓A Drive through Diamond Hill Toll Plaza✓A Turn right onto Exit 37 Valtaki Witfontein, Langverwacht farm is on the left.✓A	1A correct direction 1A correct direction 1A correct direction 1A correct direction (4)	MP L2 M
2.3.2	P(Snowing) = 0% ✓✓ A	2A correct answer (2)	P L2 E

2.3.3	P(Raining) = $\dfrac{2✓A}{3✓A} \times 100\%$✓ MA
	
	     = 66,67%✓CA
		1A numerator
		1A denominator
		1MA multiply by 100%
		
		1CA answer
		         (4)
		Accept $\frac{1}{3}$ = 33,33%
			P
			L2
			E

2.2.1			**[30]**

QUESTION 3 [30 MARKS]

Quest.	Solution	Explanation	T &L
3.1.1	✓ SF ✓MA Perimeter of the pool cover = 2 (26 + 14) + 4 + 4 = 88m✓CA	1SF correct values 1MA adding 8m 1CA answer (3)	M L2 M
3.1.2	✓ SF ✓MA Area of the pool = (24 × 12) + (4 ×8) =320 m² ✓ CA ✓MA ✓MA Area of the pool cover = (26 × 14) + (10 × 4) = 404 m²✓CA Times bigger = 404 ÷ 320✓MCA = 1,26 ✓CA	1SF correct values 1MA adding area 1CA answer 2MA adding 2m to each side 1CA answer 1MCA dividing by 320 1CA answer (8)	M L3 D
3.2.1	✓SF ✓MA Volume of water = (24×12 ×2) + (8×4×1) ✓SF = 608 m³ ✓CA	2 SF correct values 1MA adding volumes 1CA answer **Accept 608 000 ℓ** (4)	M L2 M
3.2.2	Number of litres of water = 608 x 1000✓C = 608 000✓A Number of teaspoons = (608 000 ÷ 1000) × 1,5✓ MA = 912✓CA ✓MA Number of litres = (912 × 5) ÷ 1000✓C = 4,56 ✓CA	**CA from Q3.2.1** 1C Conversion 1A correct Answer 1MA multiplying by 1,5 1CA answer 1MA multiply by 5 1C dividing by 1000 1CA answer	M L3 D

	OR Number of litres of water = 608 x 1000 ✓C = 608 000 ✓A Number of ml of chlorine $= \dfrac{608000 \times 7,5 \;✓MA}{1000 \;✓MA}$ = 4 560ml ✓CA Number of Litres $= \dfrac{4560}{1000}$ ✓MA = 4,56 ✓CA		(7)
3.3.1	Number of litres of water = 9 × 3,78541 ✓C = 34,07 ✓A	1C Conversion 1A answer (2)	M L2 M
3.3.2	Number of minutes = 608 000 ÷ 34,07 ✓MCA = 7 845,61 ✓CA Number of hours = 17 845,61 ÷ 60 ✓C =297,43 ✓CA Number of days = 297,43 ÷ 24 ✓C =12,39 days =13 ✓R	**CA from Q3.3.1** 1MCA dividing by 34,07 1CA answer 1C dividing by 60 1CA answer 1C dividing by 24 1R rounding (6)	M L3 D
			[30]

QUESTION 4 [30 MARKS]

Quest.	Solution	Explanation	T &L
4.1.1	✓ SF ✓M A ✓SF Area of metal border = $(3{,}142 \times 57^2) - (3{,}142 \times 50^2)$ $= 2\ 353{,}36$ cm²✓CA	2SF correct values 1MA subtracting area 1CA answer (4)	M L3 M
4.1.2	✓ SF SA = $(3{,}142 \times 50^{2)} + (\ 2 \times 3{,}142 \times 50 \times 25)$ $= 15\ 710$ cm²✓A Total area = $2\ 353{,}36 + 15\ 710$✓MA $= 18\ 063{,}36$cm²✓CA Convert to m² = $18\ 063{,}36 \div 100^2$ ✓C $= 1{,}806336$✓CA Including 10% = $1{,}806336 \times 1.10$✓MA $= 1{,}986$m² $= 1{,}99$ m² Siya's claim is **CORRECT**✓O	**CA from Q4.1.1** 1SF correct values 1A correct answer 1M A adding area 1CA answer 1C Conversion 1CA answer 1MA multiplying by 1.10% 1O opinion (8)	M L4 D
4.1.3	✓MCA ✓MA Number of litres = $(1{,}99 \times 2) \div 5$ $= 0{,}796$ litres✓CA $= 1$ litre✓R	**CA from Q4.1.2** 1MCA multiplying by 1,99 1MA dividing by 5 1CA answer 1R rounding (4)	M L2 M

4.2.1	Fixed cost = R800+R650✓MA = R1 450 Cost price = (530÷2) +199✓MA = R464 ✓A ✓A ✓A Total Expense = R1 450 + (R464 × number of fire pits)	1MA adding correct values 1MA dividing by 2 and adding 199 1A for R1 450 1A for R464 1A number of fire pits (5)	M L3 M
4.2.2a	✓ A ✓A 2,7 fire pits; R2700	2A correct values (2) **Accept 3; R 2 700**	M L2 M
4.2.2b	Income made selling the fire pits is equal to expenses incurred in making the fire pits✓✓O	2O explanation (2)	M L1 E
4.2.3	✓RT ✓MA ✓MA Profit = (R1000×15) – (1450 +R464 × 15) = R6 590✓CA Siya is INCORRECT✓O	**CA from Q4.2.1** 1RT selling price 1MA subtracting 1450 1MA subtracting cost 1CA answer 1O opinion (5)	M L4 M
		[30]	

QUESTION 5 [29 MARKS]

Quest.	Solution	Explanation	T & L
5.1.1	Distance in miles $= 4158 \times 1,151$ ✓C $= 4785,858$ ✓A Distance in km $= 4785,858 \div 0,6215$ ✓C $= 7700,50$ km ✓CA	1C conversion 1A correct answer 1C conversion 1CA correct answer (4) **NPR**	MP L2 M
5.1.2	Time in hours $= 10 \div 60$ ✓ C $= 0,167$ ✓ A Speed $= 7700,50$ km $\div 13,167$ hours ✓ MA $= 584,83$ km/h ✓CA	**CA from Q5.1.1** 1C conversion 1A correct answer 1MA dividing by 13,167 1CA answer (4)	MP L3 M
5.1.3	Number of people per km² $= 2\,900\,000 \div 1285,3$ ✓ MA $= 2\,256,28258$ $= 2\,256$ ✓A	1MA dividing by 1285,3 1A correct answer (2)	MP L1 M
5.2.1	Distance on map $= 9,8$ cm ✓A $\quad\quad\quad\quad\quad\quad$ ✓MCA $\quad\quad$ ✓C Actual Distance: $= (9,8$ cm $\times 2\,000\,000) \div 100\,000$ $= 196$ km ✓CA	1A $\quad$ measuring distance 1MCA multiplying by scale 1C $\quad\quad$ convert to km 1CA $\quad\quad$ simplification (4) **Accept 9,7cm to 9,9 cm**	MP L3 M

5.2.2	Cost of train trip	$= €52 ÷ €0,049$ ✓C	1C	Conversion	MP
					L4
		$= R1\ 061,22$ ✓A	1A	correct answer	D
	Fraction of the cost	$= 1\ 061,22 ÷ 2697$ ✓ MA	1MA	dividing by 2697	
		$= 0,39$ ✓CA	1CA	answer	
	Mia's claim is **INCORRECT** ✓O		1O	opinion (5)	

5.2.3	Return trip $= 60,9 × 2$ ✓ MA	1MA multiplying by 2	MP
			L3
	$= 121,8$ km ✓ A	1A correct answer	D
	Litres of petrol $= (121,8 × 6,6) ÷ 100$ ✓ MA	1MA multiplying by 6,6 and dividing by 100	
	$= 8,0388$ litres ✓ CA	1CA answer	
	Cost $= €1,865 × 8,0388$ ✓ MCA	1MCA multiplying by 8,04	
	$= €14,99$ ✓ CA	1CA answer	
		(6)	

5.2.4			MP
	Time in mins $= 75+45+75+90$ ✓ MA	1MA adding time	L4
	$= 285$ mins ✓ A		D
		1A correct answer	
	Time in hours and mins $= 285 ÷ 60$ ✓ C	1C Conversion	
	$= 4$ hours 45mins ✓ CA	1CA convert to hours and mins	
	Arrival Time $= 13:45 + 4$hours 45mins ✓ MCA	1MCA adding time	
	$= 18:30$		
	Statement is **CORRECT** ✓O	1O opinion	
		(5)	
		[30]	

TOTAL MARKS: 150