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**NATIONAL
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GRADE 12

SEPTEMBER 2023

MATHEMATICAL LITERACY P2

MARKS: 150

TIME: 3 hours

This question paper consists of 12 pages and an addendum with 4 annexures.

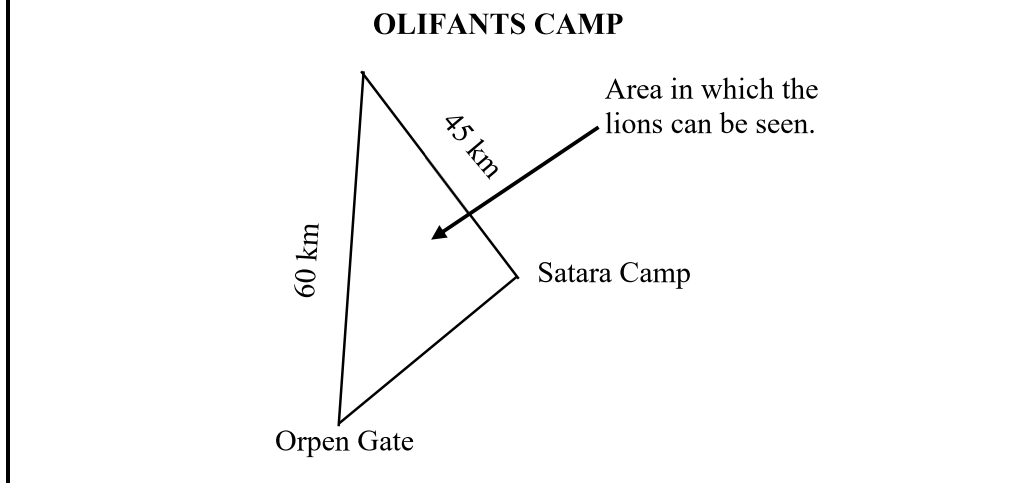
INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions.
2. Use the ANNEXURES in the ADDENDUM to answer the following questions:
 - ANNEXURE A for QUESTION 1.3
 - ANNEXURE B for QUESTION 3.1
 - ANNEXURE C for QUESTION 4.1
 - ANNEXURE D for QUESTION 5.1
3. Answer ALL the questions.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Diagrams are NOT necessarily drawn to scale.
6. Round off ALL the final answers appropriately according to the context used, unless stated otherwise.
7. Indicate units of measurement, where applicable.
8. Start EACH question on a NEW page.
9. Show ALL calculations clearly.
10. Write neatly and legibly.

QUESTION 1

1.1

In the Kruger National Park, lions can be seen in an area from the Orpen Gate, to the Satara Camp and the Olifants Camp. The direct distance between Olifants Camp and Satara Camp is 45 km, and the direct distance between Olifants Camp and the Orpen Gate is 60 km. The total perimeter of the area is 144,69 km.



Use the information above to answer the questions that follow.

- 1.1.1 Define the term *perimeter* in the above context. (2)
- 1.1.2 Calculate the direct distance between Satara Camp and the Orpen Gate. (2)
- 1.1.3 Write in simplified ratio form, 60 km to 45 km. (2)
- 1.1.4 Convert 144,69 km to mm. (2)
- 1.1.5 Write down ONLY the letter (A–C) next to question number (1.1.5) of the correct formula to calculate the size of the area where lions can be seen. (2)
- A Area = length \times width
- B Area = $\pi \times (\text{radius})^2$
- C Area = $\frac{1}{2} \times \text{base} \times \text{height}$

1.2

Aphiwe saw that Omo auto washing powder detergent is on promotion at two shops.

PROMOTION SHOP A 3 KG WASHING POWDER	PROMOTION SHOP B 2 KG WASHING POWDER
<div>Price = R129,99</div> 	<div>Price = R84,99</div> 

[Source: www.clicks.com]

NOTE:

- Promotion available from 28 February 2023 to 30 April 2023.
- 3 kg washing powder will wash 30 loads in a washing machine.

Use the information above to answer the questions that follow.

- 1.2.1 Determine the total number of days this promotion is available. (2)
- 1.2.2 (a) Calculate the cost per load for the 3 kg washing powder. (2)
- (b) Write down the price per kg for the 2 kg bag. (2)
- 1.2.3 Determine how many loads can be washed with 4 kg washing powder if it is in the same ratio as the 3 kg bag. (2)
- 1.2.4 Aphiwe has $\frac{3}{4}$ of a 2 kg bag left at home. Write down how many grams is left in the bag. (2)

1.3

Eldrid and his son decide to travel from their hometown of Vanrhynsdorp in South Africa to Keetmanshoop in Namibia, for a hunting expedition.

On ANNEXURE A is a strip chart indicating their route.

Use ANNEXURE A to answer the questions that follow.

- 1.3.1 What do the distances on the right of the N7 indicate versus the distances on the left? (2)
- 1.3.2 Write the distance from Cape Town to Keetmanshoop in meters. (2)
- 1.3.3 Calculate the distance that Eldrid and his son must travel to reach Keetmanshoop, if it is 2 km from their home to the main road. (3)
- 1.3.4 Write down the road number on which they will travel when they are in Namibia. (2)
- 1.3.5 How many towns would Eldrid and his son pass while travelling through South Africa? (2)

[31]

QUESTION 2

- 2.1 Terrence builds models of furniture. He noticed a chair on the internet that he would like to build. He decided to use a scale of 1 : 15. Below is a picture of the chair with some of the actual dimensions shown.

NOTE: Dimensions of the chair

Height = (H)	Width = (W)	Depth = (D)
1,2 m	0,6 m	

Scale 1 : 15

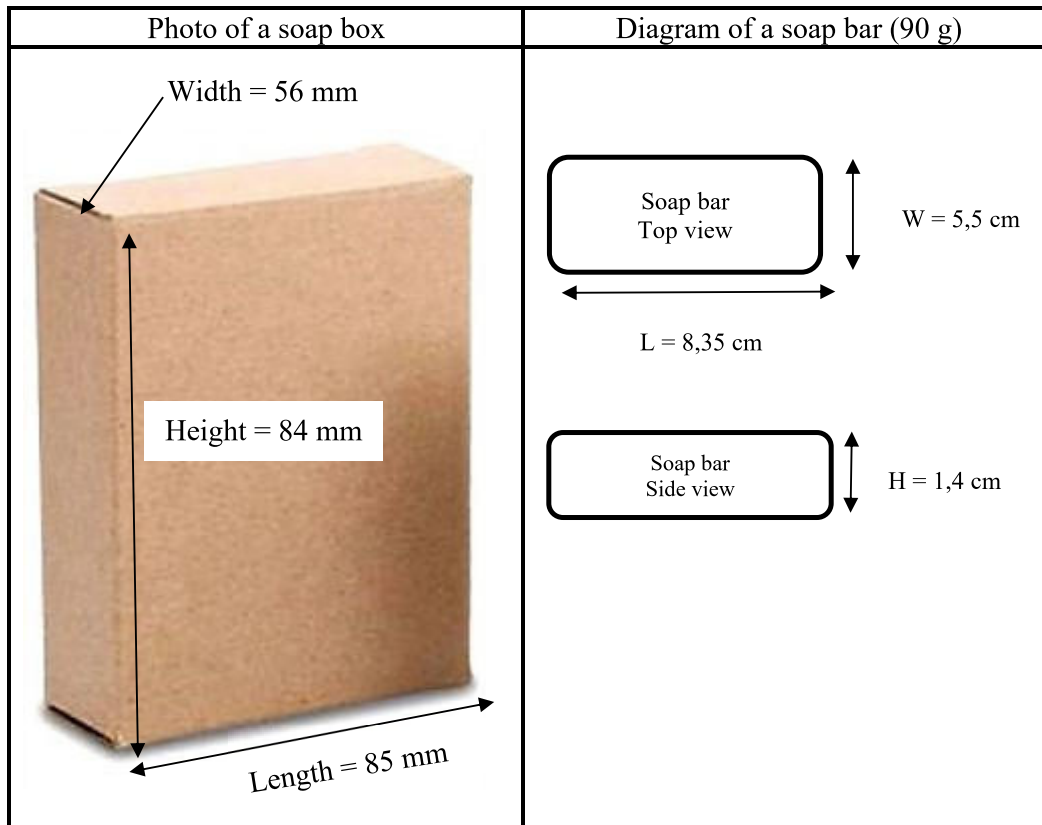
[Adapted from <https://www.xoticbrands.net>]

Use the information above to answer the questions that follow.

- 2.1.1 Define the meaning of the scale 1 : 15. (2)
- 2.1.2 Calculate the depth of the chair if it is 37,5% of the height of the chair. (2)
- 2.1.3 Use the scale to determine how big Terrence must draw the height and the width of the chair on the plan in cm. (5)

2.2

Fragrant soap bars are packed in boxes to be shipped to shops. Below is a picture of the soap box and the diagram with dimensions of the soap bar.

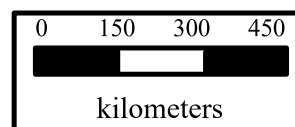


Determine the maximum number of soap bars that will fit in the soap box.

(5)

2.3

Below is a map of New Zealand. The Jones couple from Auckland are planning a trip around New Zealand.



Use the information above to answer the following questions.

2.3.1 Give ONE advantage of using a bar scale. (2)

2.3.2 The distance measured on the map between Auckland and Queenstown is 79 mm.

Calculate (to the nearest km) the actual distance between Queenstown and Auckland. (5)

2.3.3 Write down in which general direction is Queenstown from Auckland. (2)

2.3.4 Give ONE possible reason why it is said that if you want to travel by car from Queenstown to Auckland the route will include a ferry or a boat. (2)

[25]

QUESTION 3

- 3.1 Miss J. Nolan is baking brownies using the ingredients and information given on ANNEXURE B. She wants to be finished with the baking at 16:45. She can only bake one batch of brownies at a time. While a batch is in the oven, she prepares the next batch and places it in the oven the moment the previous batch is taken out.

Use the information on ANNEXURE B to answer the questions below.

- 3.1.1 Miss Nolan would like to bake 80 brownies. Determine the number of batches she needs to bake. (2)

- 3.1.2 Calculate what time she must start preparing the first batch of brownies to be finished with the baking on time. (6)

- 3.1.3 Convert the baking temperature to degrees Celsius ($^{\circ}\text{C}$), rounded off to the nearest 10 degrees.

You may use the formula: $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1,8$ (3)

- 3.1.4 Miss Nolan only has $2\frac{1}{2}$ blocks of butter. Verify whether the butter she has is sufficient for 80 brownies. (8)

- 3.2 Miss Nolan uses a square baking pan with dimensions of 8 inches by 8 inches. She cuts the brownies in the baking pan into 16 equal sized blocks.

NOTE: 1 inch = 2,54 cm

You may use the formula:

Area of square = side \times side

- 3.2.1 Calculate the top surface area of one of the square brownie blocks in cm^2 . (6)

- 3.2.2 Only 80% of the 80 brownies were sold. Write down the number that was left. (4)

- 3.2.3 Write, in ratio simplified form, the ratio number of brownies sold to number of brownies left. (3)

[32]

QUESTION 4

- 4.1 Benjamin and Jody's favourite motor sport is Formula One racing. The next Formula One Grand Prix they wish to attend takes place in Italy.
ANNEXURE C shows the racetrack for the Autodrom Nazionale Monza Circuit in Italy where the Formula One race will take place.

Use ANNEXURE C to answer the questions that follow below.

4.1.1 Calculate the distance covered after 35 completed laps. (3)

4.1.2 The ticket provider indicated that grandstand seat numbers 18, 21 and 4 are available. Benjamin and Jody decide to buy tickets for grandstand 4.
Provide ONE possible reason for their choice. (2)

4.1.3 Write down which grandstand is situated north-east of the starting line. (2)

- 4.2 Lewis Hamilton, a Formula One race car driver, set a new lap record during 2020 at the Autodrom Nazionale Monza Circuit in Italy. His record time lap time (in minutes and seconds) was 1 min : 18,887 sec.
In the 2022 Grand Prix Max Verstappen's average lap time was 1 min : 27 sec.

Use the information above to answer the questions that follow.

4.2.1 Determine the difference in time between Lewis Hamilton and Max Verstappen. Round your answer off to the nearest second. (3)

4.2.2 Calculate to the nearest metre per second the average speed achieved by Lewis Hamilton in the one lap where he set the record.

You may use the following formula:

$$\text{Distance} = \text{Speed} \times \text{Time} \quad (5)$$

- 4.3 The following guidelines relate to the rules governing the weight of the Formula One race car:
- The race car weighs 2002,14 pounds including the driver and fuel
 - Lewis Hamilton, the driver for the Mercedes race car, weighs 73 kg
 - His height is 1740 mm
 - The fuel in a race car weighs 110 kg

NOTE: 1 kg = 2,205 pounds

$$\text{BMI} = \frac{\text{Weight in kg}}{(\text{Height in m})^2}$$

4.3.1 Determine Lewis Hamilton's body-mass-index (BMI). Round off your answer to two decimal places. (4)

4.3.2 Jody states that the average weight of the Mercedes race car is 790 kg while Benjamin stated that the average weight is 750 kg. Verify, by showing all calculations whether the statements are valid. (6)

[25]

QUESTION 5

- 5.1 The Life Science teacher is doing a research on bees. He focuses mainly on the three kinds of honey bees, namely the worker bee, queen bee and the drone bee. As part of his research he builds scale models of the honey bees built.

On ANNEXURE D is a picture of the models he built.

[Source: <https://www.pinterest.com.honeybees>]

Use the information above to answer the questions that follow.

- 5.1.1 A queen bee is approximately 2 cm in length. The length of the teacher's model is 23 inches.

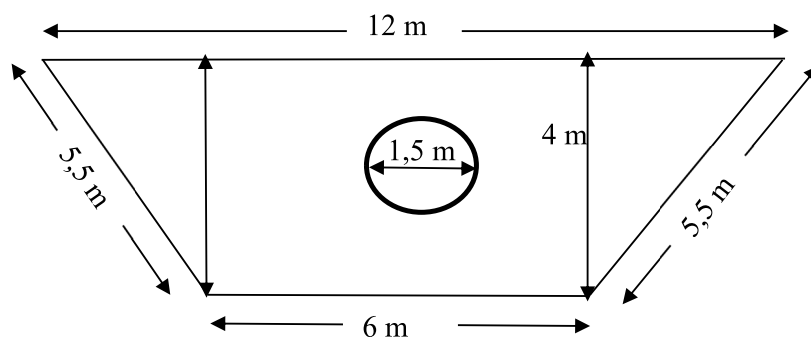
- (a) Show that the model that the teacher built is 29 times bigger than the actual bee.

NOTE: 0,5 inches = 12,7 mm (5)

- (b) Write down the ratio scale for this enlargement. (2)

- 5.1.2 A honeybee flies at an average speed of 24 km/h and its wings beat 200 times per second causing their distinctive buzz. Show by means of calculations that the bees wings will beat 300 000 times if it flew 10 kilometres. (5)

- 5.2 Landscaping gurus shows the top view of a botanical garden in the shape of a trapezium. There is a circular water tank with diameter 1,5 m in the garden.



[Adapted from *New Era Exam guide*]

Use the information above to answer the questions that follow.

- 5.2.1 Calculate the perimeter of the botanical garden. (2)

- 5.2.2 Determine the area taken up by the vegetable garden excluding the water tank area. You may use the following formulae:

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height};$$

$$\text{Area of rectangle} = \text{length} \times \text{width}$$

$$\text{Area of circle} = \pi \times (\text{radius})^2 ; \text{ where } \pi = 3,142 \quad (8)$$

- 5.2.3 The volume of the water tank is $8,84 \text{ cm}^3$. Calculate the height of the circular water tank rounded off to the nearest m. (5)

You may use the following formula:

$$\text{Volume of water tank} = \pi \times (\text{radius})^2 \times \text{height}; \text{ where } \pi = 3,142$$

5.3

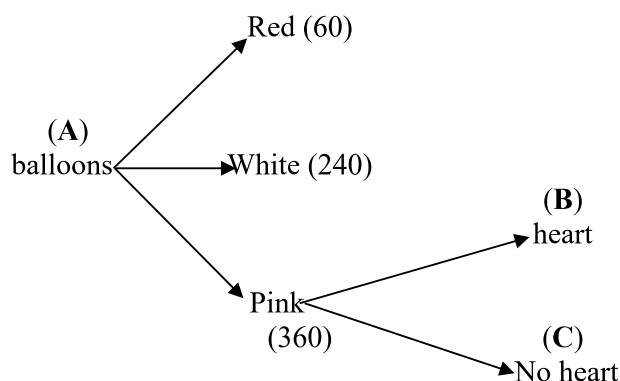
At a function a helium balloon with the number of the seat was attached to each chair. There were 60 red balloons, 240 white balloons and 360 pink balloons.

Inside 10% of the pink balloons was a piece of paper in the shape of a heart. Each learner whose chair had a pink balloon attached to it, received a free rose.

NOTE: *A helium balloon is a balloon that is filled with helium and rise into the air if not held.*

Use the information above to answer the questions that follow.

- 5.3.1 The following tree diagram was drawn to simplify the information.



- (a) Determine the number of balloons at each of the letters **A**, **B** and **C**. (5)
- (b) Write down the probability of randomly selecting a balloon that has a heart shaped paper in it. (2)
- 5.3.2 Determine the probability of receiving a free rose in simplified fraction format. (3)

[37]

TOTAL: 150