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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2021

MATHEMATICAL LITERACY: PAPER II

EXAMINATION NUMBER

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Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

- This question paper consists of:
 - 28 pages which includes 2 additional pages at the end for rough work and calculations if necessary.
 - 5 questions.
- Please check that your question paper is complete.
- Answer ALL the questions.
- All questions need to be answered in the spaces provided in the question paper. Note: Do not answer any question in an Answer Book.
- It is strongly recommended that all working details be clearly shown where necessary.
- An approved non-programmable calculator may be used where necessary.
- It is in your own interest to write legibly and to present your work neatly.
- Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
- TWO blank pages (page 27 and 28) are included at the end of the question paper. If you run out of space for a question, use these pages. Clearly indicate the question number of your answer should you use this extra space.

Question	1		2		3		4		5		Total	
	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod
Mark												
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Total	30		28		24		36		32		150	

QUESTION 1

During October 2017, 18-year-old Daniel Herbst decided to earn some pocket money by making bottled home-made chilli and garlic sauce and selling them during weekends. He decided to call the sauce CHILL BRU.

[Adapted from: <www.chillbru.co.za/about-us/>]

- 1.1 In the first 2 months, Daniel sold 1 400 bottles of his home-made sauce. His small business had suddenly become bigger than he initially planned.

- 1.1.1 State the number of bottles sold in the first month, if Daniel sold an equal number of bottles in the first two months.

(2)

- 1.1.2 By completing the calculation below, help Daniel calculate the number of bottles he sold in the third month, if he sold 30% more than the first two months.

$$\begin{aligned}\text{Number of bottles sold in the third month} &= 1\,400 + 0,3 \times \underline{\hspace{2cm}} \\ &= 1\,400 + \underline{\hspace{2cm}} \\ &= 1\,820 \text{ bottles}\end{aligned}$$

(2)

- 1.1.3 Each bottle of chilli sauce contains 350 ml of sauce. Calculate how many litres of sauce Daniel had to make in the third month.

(3)

- 1.2 A bottle of CHILL BRU sauce sells for R55 a bottle. Calculate Daniel's income in the third month.

(2)

- 1.3 Each jar of CHILL BRU sauce holds 350 ml of sauce. One liquid ounce (loz) is equal to 29,57 ml. Daniel has an option to purchase a 9 loz; 12 loz or 6 loz glass jar.

- 1.3.1 Help Daniel to convert the 350 ml to liquid ounces by filling in a correct mathematical symbol as he doesn't know if he must multiply or divide:

350 ml 29,57 ml

= liquid ounces

(2)

- 1.3.2 Write down ONE glass jar that will be most suitable to hold 350 ml of sauce.

(2)

1.3.3 Each glass jar has a rectangular branded label 8,89 cm by 7,62 cm.



[Source: <www.chillbru.co.za/>]

Daniel feels that the label needs a border along the perimeter of the label.

- (a) Circle the letter of the correct formula to calculate the perimeter of the label.

A $L \times B$

B $2L + 2B$

C $L + B \times 2$

(2)

- (b) The perimeter is calculated as 33,02. Circle the letter of the correct unit of measurement for the perimeter.

A cm

B cm^2

C cm^3

(2)

- (c) The logo takes up 83% of the label. Calculate what percentage, as a decimal, is not taken up by the logo.

(3)

- 1.4 Daniel sells his sauce at R55 per jar. Complete the following equation for his Income (I) in terms of the Number of jars sold (N).

$$I = \underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$$

(2)

- 1.5 Complete the missing values in the table illustrating Daniel's income:

Number of Jars (N)	1	2	5	10	50	550
Income (I)	R55	R110		R550	R2 750	

(2)

- 1.6 Daniel's Expenses (E), in rand, are calculated as follows: $E = 1\,000 + 36 \times N$.

- 1.6.1 State the value of Daniel's fixed expenses.

(2)

- 1.6.2 Calculate Daniel's total expenses for 550 jars of sauce.

(2)

- 1.6.3 Determine Daniel's profit if 550 jars of sauce were sold.

(2)

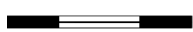
[30]

QUESTION 2

Jack and Gill plan to renovate their bathroom using the options illustrated below:



KEY:



Window in wall



Door, indicating which way it opens

Use the layout plan and the pictures to answer the questions that follow.

2.1 State the compass direction of the window.

(2)

2.2 The door opens to the right against the wall at 90° (quarter of a circle). If it is currently pushed open $\frac{2}{3}$ of the way, calculate how much further (in degrees) the door can be opened.

(3)

- 2.3 An advert for a new rectangular bathtub (150 cm long \times 70 cm wide \times 40 cm deep) caught Gill's attention. Jack states that the bath will not fit along the width of the bathroom. If one foot is equal to 30,48 cm and the thickness (width) of the wall is 110 mm, verify whether Jack's statement is valid.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

(7)

- 2.4 Jack and Gill must select tiles and taps for their bathroom. Determine how many option combinations they have to choose from if they have 3 tile options and 3 tap options.

(2)

- 2.5 Determine the probability, as a fraction, of them choosing Tile A with Tap Z.

(2)

- 2.6 Jack and Gill decide on Tile option C. Each tile is 330 mm x 330 mm in size. Each box of tiles covers an area of 1,8 m² and costs R250,20.

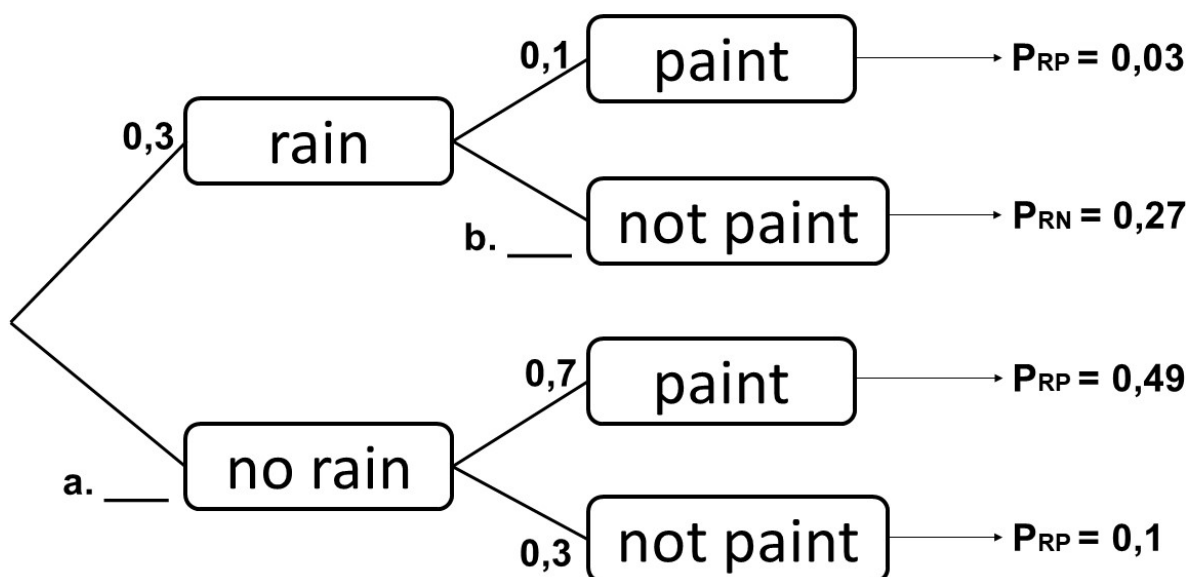
- 2.6.1 They plan to tile the floor and the front side of the bath. The floor area to be tiled is 1,95 m². Calculate the total area to be tiled and hence the number of boxes needed to tile the bathroom, if Jack and Gill have to allow for 10% cutting and wastage.

(5)

- 2.6.2 Hence calculate the total cost of the tiles.

(2)

- 2.7 Jack and Gill need to paint the bathroom walls, however, they are less likely to paint when it rains. The tree diagram below illustrates the probability that it will rain tomorrow and consequently how likely they are to paint the walls. Study the tree diagram and answer the questions that follow:



- 2.7.1 Complete the tree diagram by writing down the probabilities for **a** and **b**.

(2)

- 2.7.2 Determine the probability, as a percentage, that Jack and Gill will paint tomorrow.

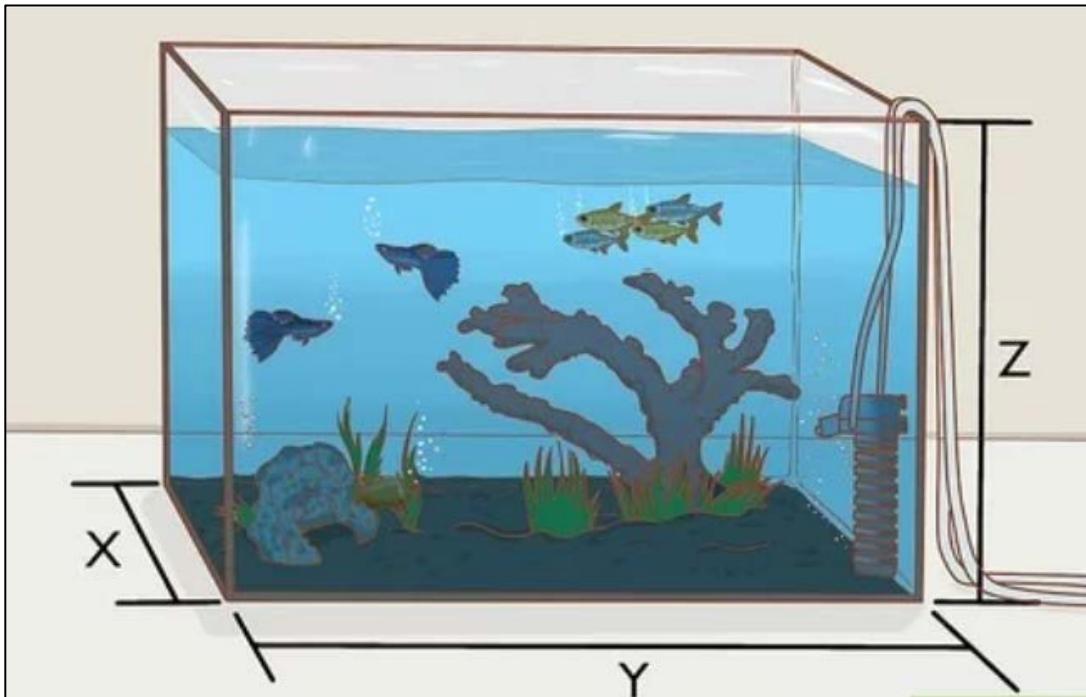
(3)

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QUESTION 3

Katlego is interested in keeping fish and has a fish tank in her room.

A fish tank is a rectangular prism with length (Y), width (X) and height (Z) as illustrated below.



[Source: WikiHow]

The dimensions of Katlego's tank are $X = 46$ cm, $Y = 92$ cm and $Z = 48$ cm.

Volume of a rectangular prism = Length \times Breadth \times Height.

The fish tank should hold one fish per gallon.

Use the above information and the diagram to answer the questions that follow.

3.1 Calculate the volume of the fish tank.

(2)

- 3.2 Determine (in cm^3/min) the rate at which the fish tank will fill if it takes 1 hour and 13 minutes to fill the tank.

(3)

- 3.3 If $1 \text{ cm}^3 = 1 \text{ ml}$, convert the rate the fish tank fills up to litres/min.

(2)

- 3.4 Katlego knows she can only have one fish per gallon of water. One gallon is equal to 3,78541 litres. Katlego already has 6 fish in her tank and has decided to purchase 20 more fish. Show, with calculations, whether or not, Katlego has enough space in her fish tank for all the fish.

(5)

- 3.5 Katlego would like to stick a picture at the back of the fish tank as per the image below.



[Adapted from: <www.amazon.com/Aquarium-Background-Backdrop-Adhesive-Underwater/dp/B07GSKVWB6>]

- 3.5.1 Calculate the area of the picture needed to cover the back of the fish tank.

(3)

- 3.5.2 The picture has dimensions 100 cm \times 50 cm and cost R130 each. Determine how much money Katlego will lose if the excess picture is cut off to make it fit exactly at the back of the fish tank.

(5)

- 3.6 An algae eater cleans the fish tank by eating the algae that grows on the inside of all the sides of the tank excluding the floor. Determine the total area of glass the algae eater must clean.

GLOSSARY: Algae: a simple, non-flowering aquatic (water) plant.

(4)
[24]

QUESTION 4

RocoMamas was founded in July 2013, and has fast become one of the trendiest restaurants in South Africa, gaining a loyal following among burger enthusiasts.

4.1 The second "O" in the RocoMamas logo is made up of a circle and a star.



[Source: <www.rocomamas.com/za/home/>]

Area of a circle = $3,14 \times r^2$

Radius of the outer circle = 4,1 cm

Use the above information to answer the questions that follow.

4.1.1 Calculate, to the nearest mm^2 , the area of the outer circle.

(3)

- 4.1.2 The area of the inner orange circle is $\frac{8}{9}$ of the area of the outer circle. The star takes up 23% of the area of the inner orange circle. Show, with calculations, that the area of the star, to the nearest mm^2 is over 1 000 mm^2 .

(5)

4.2 One of the popular desserts is their Freakshakes (milkshakes).

CHOCOLATE OREO FREAKSHAKE

(makes two)

INGREDIENTS

½ cup or 125ml ganache
 400ml milk
 2 generous scoops of ice cream
 Additional 2 scoops of ice cream for putting into the glasses.
 Whipped cream
 Oreo Biscuit
 Marshmallow



INSTRUCTIONS

Place the ganache, milk and ice cream into a blender and mix well.
 Spread ganache on the inside of the glasses and around the top outside edge.
 Add a scoop of ice cream to each one and pour in the chocolate milkshake.
 Pipe high with cream then add a brownie and a marshmallow.
 Toast the marshmallow with a brulee torch until brown and crispy.
 Serve immediately.

[Picture: <www.tripadvisor.co.za/LocationPhotoDirectLink-g312603-d9844321-i294721227-RocoMamas_Scottsville-Pietermaritzburg_KwaZulu_Natal.html>]

[Adapted from: <www.howtocookthat.net/public_html/freakshakes-crazy-milkshake-recipes/>]

GLOSSARY: Ganache: mixture of chocolate and cream, used to make chocolate candies, or as a filling in cakes and pastries.

Use the above information to answer the questions that follow.

4.2.1 Write, in simplest form, the ratio of ganache to milk.

(2)

4.2.2 Calculate, in litres, the amount of milk needed for 6 milkshakes.

(3)

- 4.2.3 This recipe takes a RocoMamas chef 3,2 minutes to make the 2 milkshakes. Convert 3,2 minutes to minutes and seconds.

(2)

- 4.2.4 The table below indicates the time the chef takes to make milkshakes.

Number of milkshakes (m)	2	4	6	8	10	12	(i)	20
Time taken in minutes (t)	3,2	6,4	9,6	12,8	16	(ii)	22,4	32

- (a) Determine the missing values (i) and (ii).

(2)

- (b) Does the relationship in the table represent a direct or indirect proportion?

(2)

- (c) Calculate the number of milkshakes that can be made in one hour.

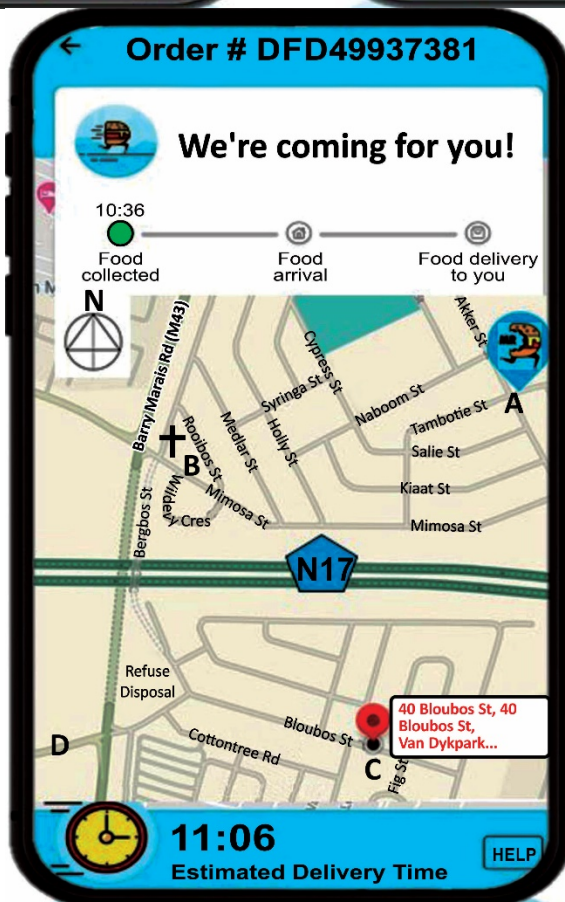
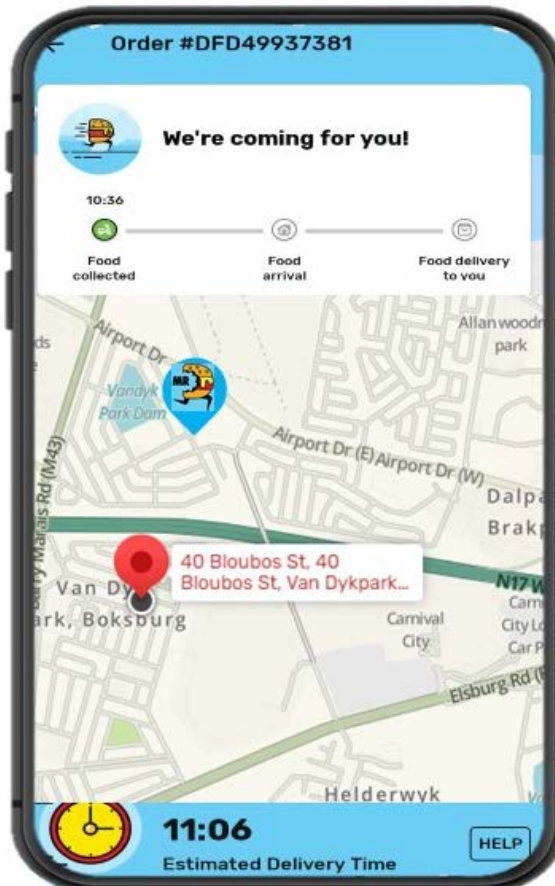
(3)

- 4.2.5 The optimum temperature to preserve ice cream is: 0°F (-17°C) or colder. Using the formula below, determine whether this statement is valid.

$$^{\circ}\text{F} = (1,8 \times ^{\circ}\text{C}) + 32$$


(4)

- 4.3 Kutlwano ordered from RocoMamas using Mr Delivery (D) Food. Given below are the screenshots of the order and delivery route.



[Adapted from: <www.mrdfood.com>]

Use the information and images on page 19 to answer the questions that follow.

- 4.3.1 If the food was only ready at 11:03, then determine the time it would be delivered to Kutlwano's house () .

(2)

- 4.3.2 Name the national road that lies North of Kutlwano's house.

(2)

- 4.3.3 Give the name of the street where Kutlwano lives.


(2)

- 4.3.4 Select, by underlining the correct answer:

The church (**B**) lies **North West/South East** from Kutlwano's house.

(2)

- 4.3.5 The Mr D driver follows the following directions but ends up lost.

The following are the directions to get to Kutlwano's house () at point C.

- From the Engen Service Station (**A**), turn left into Akker Street.
- Then turn right into Mimosa Street.
- At the Church (**B**) turn left into Bergbos Street.
- Then at the fork turn left again into Bloubos Street.

Identify where the driver went wrong if he ends up at point **D**.

(2)

[36]

QUESTION 5

DHL is an international courier, package delivery and express mail service company that delivers parcels countrywide.



DHL delivers more than 1,5 billion parcels in 220 countries worldwide.

To send a 5 kg box anywhere in South Africa will cost R1 860.

The dimensions of a 5 kg box are shown below:

Height: 180 mm

Length: 337 mm

Width: 322 mm



[Adapted from: <www.dhl.com/za-en/home.html>]

Use the above information to answer the questions that follow.

5.1 Give the cost per kilogram to send a 5 kg box anywhere in South Africa.

(2)

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

(2)

5.3 Convert your answer in Question 5.2 to m^3 .

(3)

5.4 If a $337 \text{ mm} \times 322 \text{ mm} \times 180 \text{ mm}$ box can carry 5 kg , calculate what 1 m^3 would weigh.

(3)

- 5.5 Many packages are transported by truck. Given below are the dimensions of a DHL delivery truck.



[Adapted from: <www.subpng.com/png-i9y8e5/>]

Calculate the maximum number of 5 kg boxes that can be packed onto the truck if the length of the boxes are packed on the length of the truck, the width along the width and then stacked to the roof of the truck.

(6)

- 5.6 If the scale used to build a Lego model of the DHL truck is 1:50; determine what the dimensions of a 5 kg box would be to fit into the Lego truck.



[Source: <za.pinterest.com/pin/208854501456652455/>]



Example of a Lego block

[Source: <www.kindpng.com/free/lego-blocks/>]

GLOSSARY: Lego: a line of plastic construction toys that are manufactured by The **Lego** Group.

(4)

5.7 DHL travels from Johannesburg to Cape Town either by truck or plane.



[Source: <www.google.com/maps/>]

Use the above map and information to answer the questions that follow.

5.7.1 Calculate the average speed, in km/h, of the truck travelling from Johannesburg to Cape Town, using the formula: $\text{Speed} = \text{Distance} \div \text{Time}$

(3)

5.7.2 If 12,6 cm on the map is equal to 1 262 km in real life, determine the unit scale of the map.

(3)

- 5.7.3 Using your scale and relevant calculations, draw a line on the map connecting a town from Durban that is 400 km away as the crow flies.

(4)

- 5.7.4 The shortest distance between Johannesburg and Cape Town is 1 261 km, which equals 784 miles. Determine how many kilometres there are in one mile.

(2)

[32]

Total: 150 marks

CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

[illegible]

[illegible]