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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2022

MATHEMATICAL LITERACY: PAPER II

EXAMINATION NUMBER

Time: 3 hours 150 marks

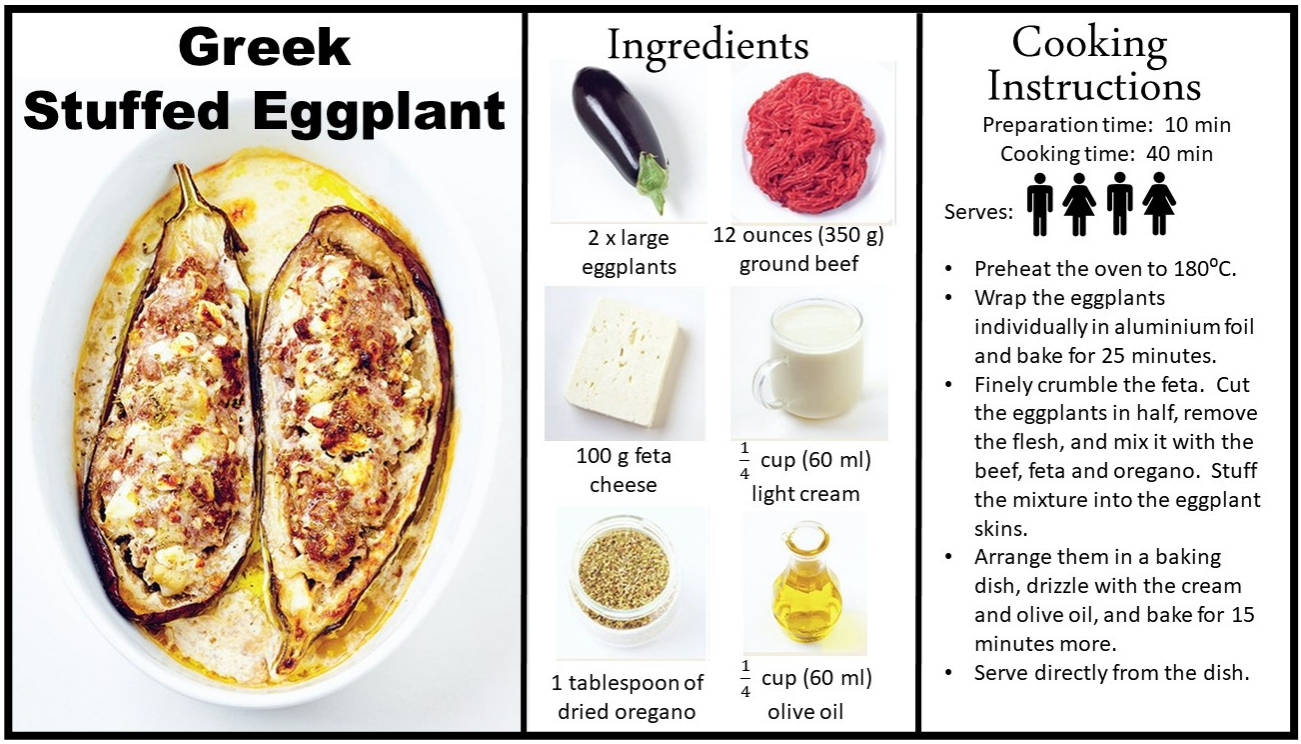
PLEASE READ THE FOLLOWING INSTRUCTIONS AND INFORMATION CAREFULLY

1. This question paper consists of:
   - 24 pages.
   - 5 questions.
2. Please check that your question paper is complete.
3. Write your examination number in the space provided above.
4. Answer ALL the questions.
5. All questions need to be answered in the spaces provided on the question paper. Note: Do not answer any question in an Answer Book.
6. It is strongly recommended that all working details be clearly shown where necessary.
7. An approved non-programmable calculator may be used where necessary.
8. It is in your own interest to write legibly and to present your work neatly.
9. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
10. ONE blank page (page 24) is included at the end of the question paper. If you run out of space for a question, use this page. Clearly indicate the 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												
Signature												
Total	30		28		29		30		33		150	

QUESTION 1

Mondlo is trying a recipe for making Greek stuffed eggplant. The recipe below shows the ingredients and cooking instructions needed for making Greek stuffed eggplant.



Use the above recipe to answer the questions that follow.

1.1 Write down the maximum number of people this recipe will cater for.

_____

_____

(2)

1.2 If $\frac{1}{4}$ cup of oil is equivalent to 60 ml, determine how many millilitres there are in one cup.

_____

_____

_____

(2)

1.3 State the total recommended time it will take Mondlo to prepare and cook this dish.

_____

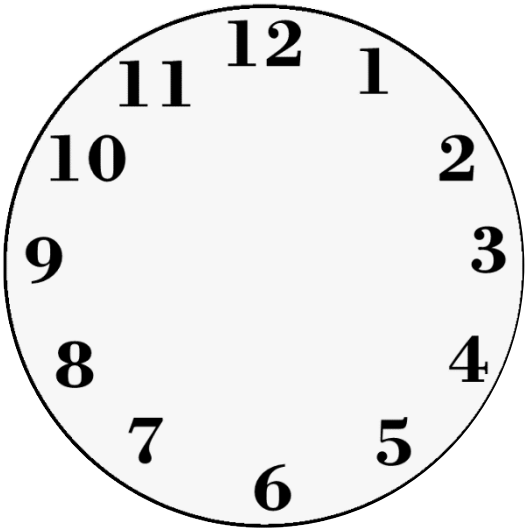
_____

(2)

1.4 If Mondlo starts preparing this dish at 5.37 pm, determine the earliest time he will be ready to serve this dish. Write your answer using the 24-hour clock format.

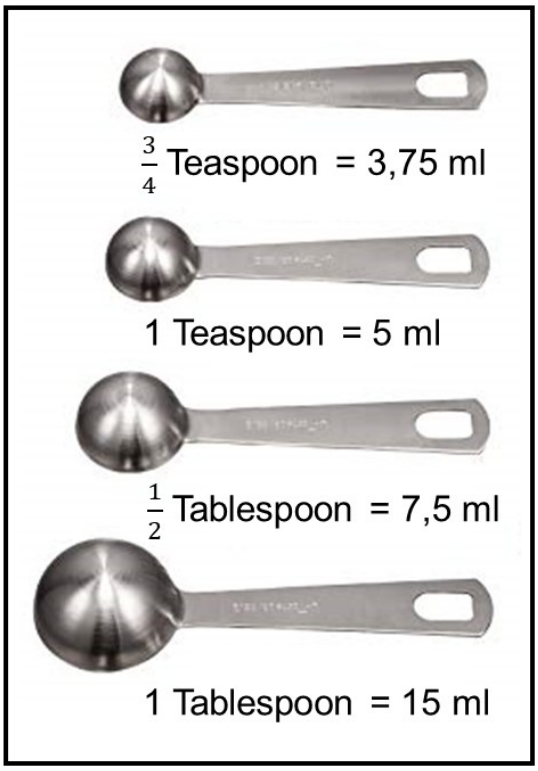
(2)

1.5 Illustrate clearly on the clock below the time calculated in Question 1.4.



(2)

1.6 Mondlo does not have a measuring jug, but he has measuring spoons.



1.6.1 State how many teaspoons make up one tablespoon.

(2)

1.6.2 Write, in simplified form, the ratio of the number of millilitres in a teaspoon to the number of millilitres in a tablespoon.

(2)

1.6.3 Determine what percentage a $\frac{3}{4}$ teaspoon (3,75 ml) is of one tablespoon.

(3)

1.6.4 Given 110 ml = 110 g. Determine the least number of spoons that must be used to measure 110 g of oregano.

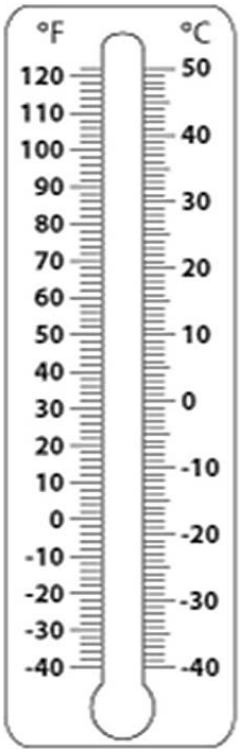
_____

_____

_____

(2)

1.7



1.7.1 Reading off the thermometer, complete:

10 °C = _____°F

(2)

1.7.2 The light cream must be kept in a fridge at 4 °C. On the thermometer alongside, clearly indicate this temperature.

(2)

1.7.3 A freezer maintains a temperature of 22 °C lower than a fridge. State the temperature of the light cream in degrees Celsius if it should be kept in the freezer.

_____

_____

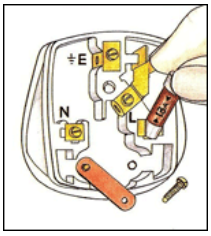
(2)

1.8 Assist Mondlo by matching the instructions (on the left) to change a plug with the correct matching image of the plug (on the right).

1.8.1 **Unscrew the plug cover:**

Loosen the screws that you can see on the outside of the plug.

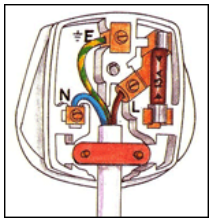
A



1.8.2 **Remove the fuse:**

Carefully lever the fuse out with a screwdriver if necessary. Loosen the small screws at the terminal.

B



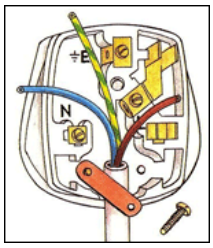
1.8.3 Position the wire in the plug so that the white part of the wire is inside the plug itself.

Remember:

- Green/yellow wire is fixed to the top (marked E).
- Blue wire is fixed to the left (marked N).
- Brown wire is fixed to the right (marked L).

If the wires are small, it may help to fold them over and then insert them into the terminal holes.

C

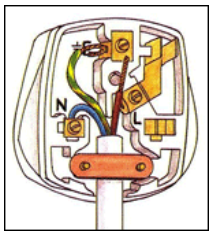


1.8.4 Insert the exposed wire (metal part not the plastic cover) into the holes beneath the little screws.

Tighten each screw and check that there are no stray 'whiskers' of bare wire.

Fasten the cable clamp firmly over the outer 'sheath' (usually white).

D



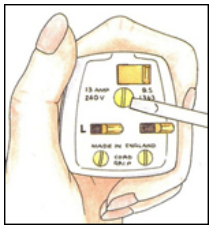
1.8.5 **Final check:**

1. Wires are connected to the correct terminals.
2. There are no stray 'whiskers' of wire.
3. Flex clamp is on outer sheath of cable, not on wires.
4. All screws are tight.

Then:

5. Fit the correct fuse into the socket.
6. Refit plug cover and screw tight.

E



Fill in the correct letter of the image (A to E), next to the instruction number in the table below:

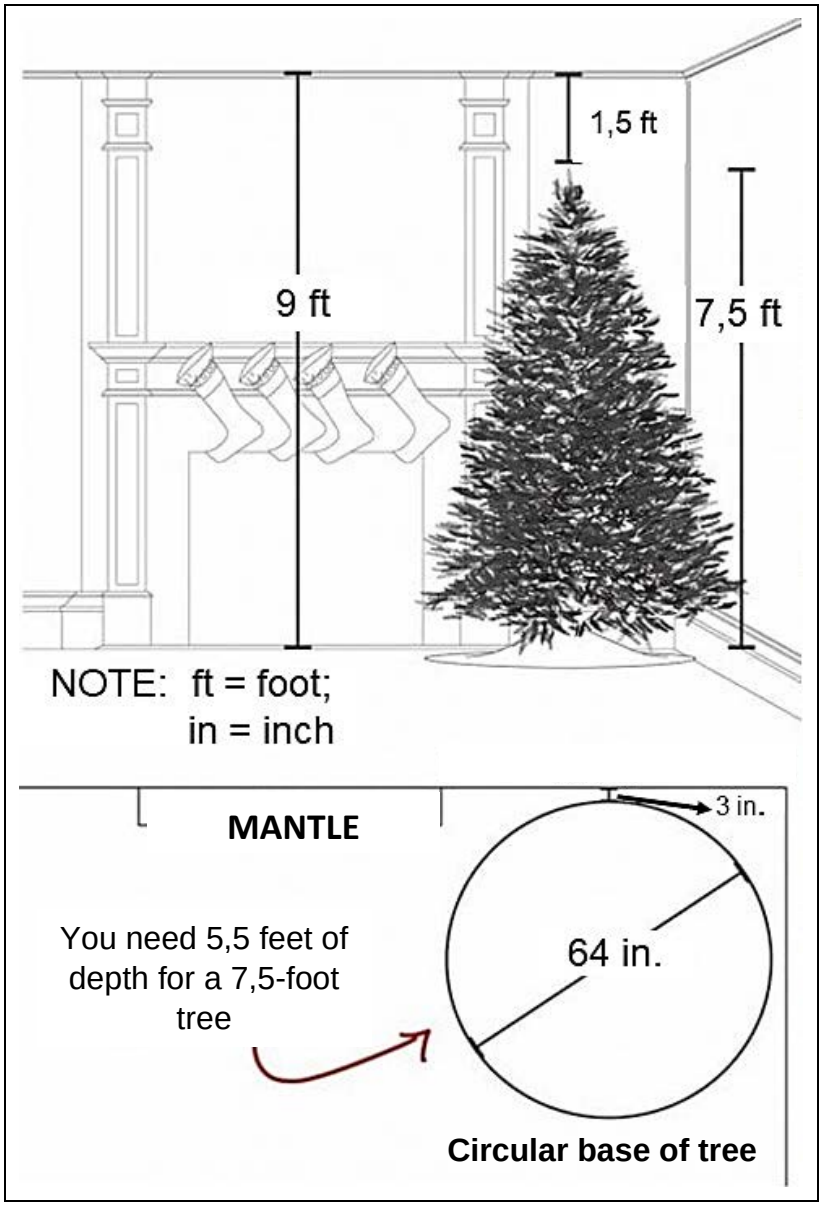
1.8.1		1.8.2		1.8.3	
1.8.4		1.8.5			

(5)
[30]

QUESTION 2

Many people worldwide celebrate religious holidays by decorating trees and mantles, making delicious meals, and sharing gifts.

2.1 It is recommended that a 7,5-foot tree must have a 1,5-foot clearance from the ceiling and will take up a circular space with a diameter of 64 inches at the base. This information is illustrated in the diagram below.



Use the above information to answer the questions that follow:

2.1.1 Give the floor-to-ceiling height required for a 7,5-ft tree.

_____

_____

_____

(2)

2.1.2 If 1 foot = 0,3048 metres, determine, in centimetres, the height of the tree.

(3)

2.1.3 Determine, in inches, the radius of the circular base of the tree.

(2)

2.1.4 Calculate, in inches, the area of the circular base of the tree.
You may use the following formula:

Area of a circle = 3,14 × radius × radius

(2)

2.2 It is given that a 5-ft tree requires 31 baubles, 778 cm of tinsel and 468 cm of lights with a 15-cm tree topper on the top.

Glossary:
Baubles = a small, showy trinket or decoration.
Tinsel = a type of decorative material that mimics the effect of ice, consisting of thin strips of sparkling material attached to a thread.
Tree topper = a decoration that sits on the top of the tree.

2.2.1 To calculate the length of tinsel needed to decorate any tree the following formula may be used:

Length of tinsel $= \frac{13 \times \pi}{8}$ **× height of tree (in cm)**, where $\pi = 3{,}14$ and 1 ft = 30,48 cm.

Show, using the given formula, that 778 cm of tinsel will be enough for a 5-ft tree.

(4)

2.2.2 The height of the tree topper can be calculated as follows:

Height of the tree topper (in cm) = tree height (cm) ÷ 10

Prove that the tree topper for a 1,5-m high tree is 15 cm.

(2)

2.2.3 Calculate the number of baubles per foot if 31 baubles are needed for a 5-ft tree.

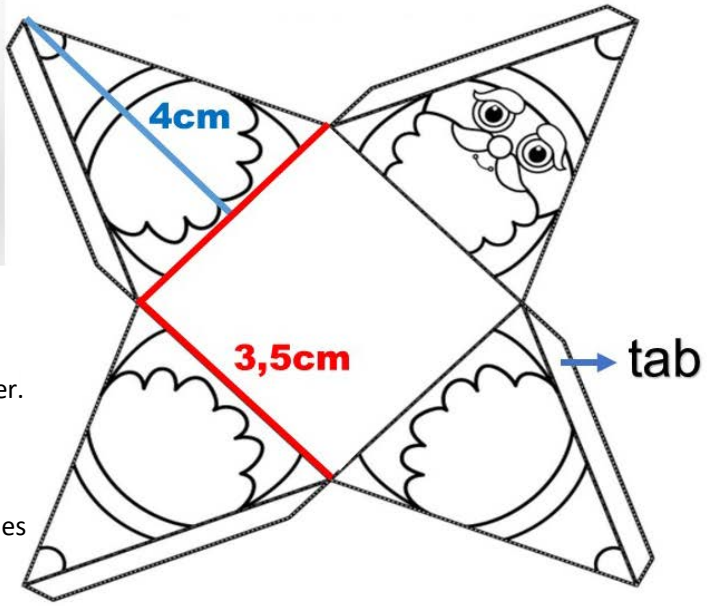
(2)

2.2.4 If the rate calculated in Question 2.2.3 remains constant, determine the number of baubles needed to decorate a 7,5-ft tree.

(3)

2.3 Shown below is a template and completed pictures of paper ornaments. Each paper ornament has four equal triangles folded inwards on a square base.

1
Cut these lines with a pair of scissors.
2
Score fold lines by tracing with a black pen & ruler.
3
Use a glue stick to spread glue on the tabs.
4
Fold the triangle sides together along scored lines into a pyramid shape, using the tabs to glue the sides together.



Use the above information to answer the questions that follow:

2.3.1 Determine, in cm^2, the total surface area of one paper ornament excluding the four tabs. You may use the following formulae:

Area of a triangle = ½ base × perpendicular height

Area of a square = side × side

(5)

2.3.2 Show with calculations that the paper ornament can be cut from a square piece of paper with an area of 132,25 cm^2.

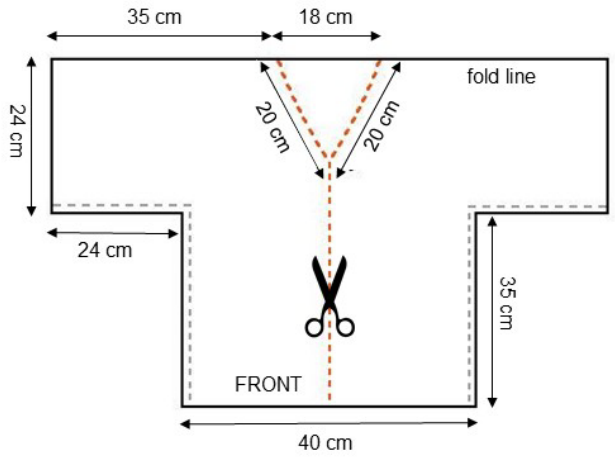
(3)
[28]

QUESTION 3

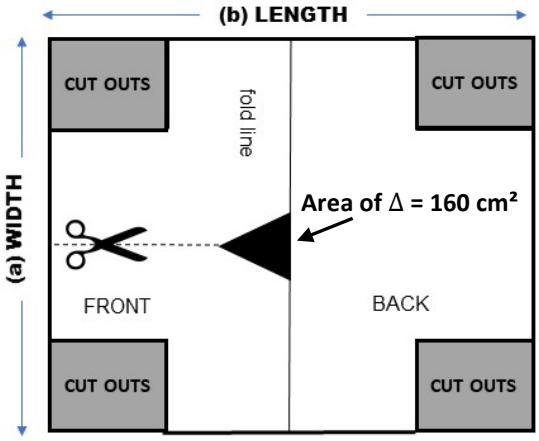
Solana is an avid designer who loves to incorporate African flair in her designs. She wants to design a kimono. Below are diagrams showing the FRONT and BACK-TO-BACK views of the kimono. The back of the kimono is a complete piece of fabric, an exact copy of the front but without any cuts. The kimono is made from one piece of fabric.

Glossary: The kimono is a T-shaped, wrapped-front garment with square sleeves and a rectangular body, it is a traditional Japanese garment and the national dress of Japan.

Front view of kimono



Back-to-back view of complete kimono



Use the above information to answer the questions that follow.

3.1 Using a scale of 1:10, sketch a scaled drawing of the front of the kimono in the space provided below.

(3)

3.2 Solana will cut the pattern from one rectangular piece of fabric. Determine the width and length of this rectangular piece of fabric, represented by (a) and (b) on the diagram on page 11.

(3)

3.3 Determine how much fabric will be wasted due to cutting.
You may use the following formula:

Area of a rectangle = length × width

(3)

3.4 Convert your answer in Question 3.3 to m^2.

(2)

3.5 The fabric chosen to make the kimono costs R129,99/m and is 115 cm wide.

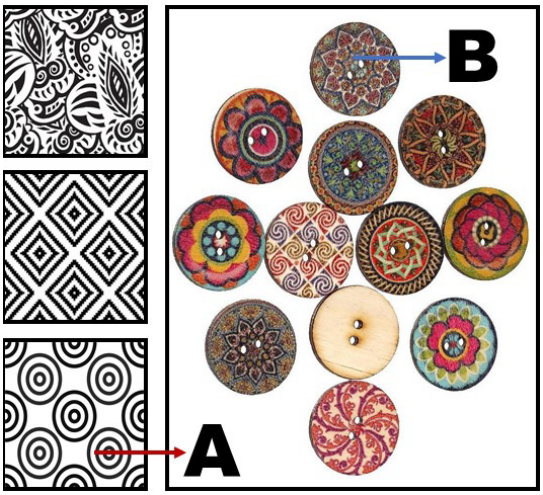
3.5.1 If an additional 10% of fabric is needed in the length and the width, calculate, in centimetres correct to one decimal place, the total length and total width of fabric required to make the kimono.

(3)

3.5.2 Solana has a budget of R195,00 to purchase the fabric required to make the kimono. State with calculations whether her budget is enough if the fabric is rounded to the nearest half metre.

(4)

3.6 Solana has three different fabric patterns and twelve different handmade buttons to choose from for her kimono design as illustrated below:



Use the above information to answer the questions that follow.

3.6.1 Determine the probability of Solana randomly choosing the fabric labelled A.

_____

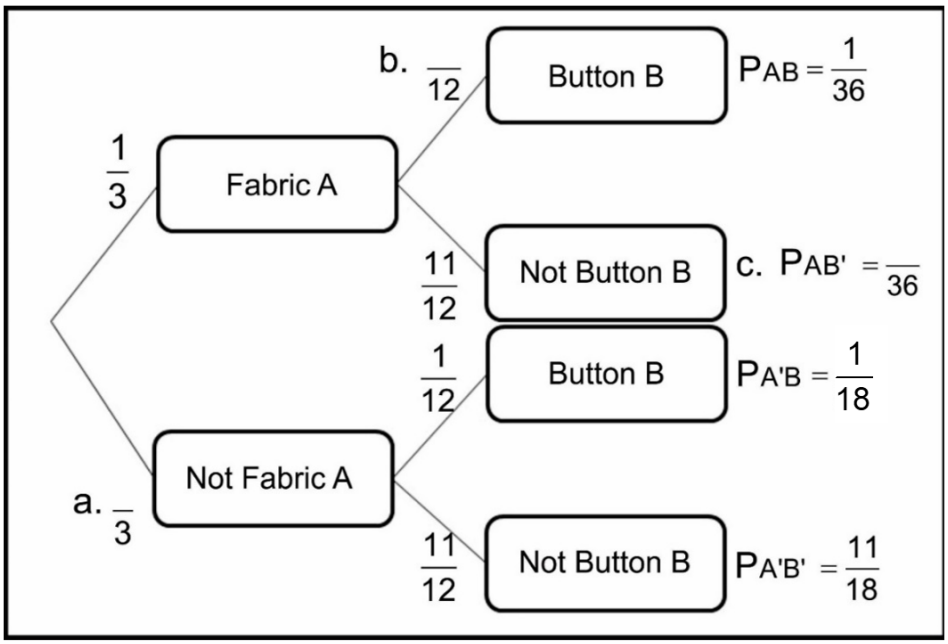
(2)

3.6.2 State the probability of her randomly choosing the button labelled B.

_____

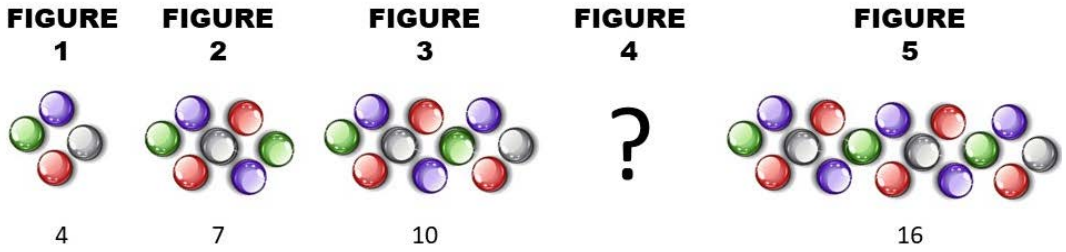
(2)

3.6.3 The tree diagram below illustrates the probability of Solana choosing fabric A and button B. Complete the missing values a, b and c on the diagram below.



(3)

3.7 Solana designs a beaded collar for a shirt. She uses the pattern below:



Number of beads	4	7	10	16

Use the above information to answer the questions that follow.

3.7.1 If the pattern continues, show that FIGURE 4 has 13 beads, with the aid of a sketch.

(2)

3.7.2 Determine the number of beads in the eighth figure.

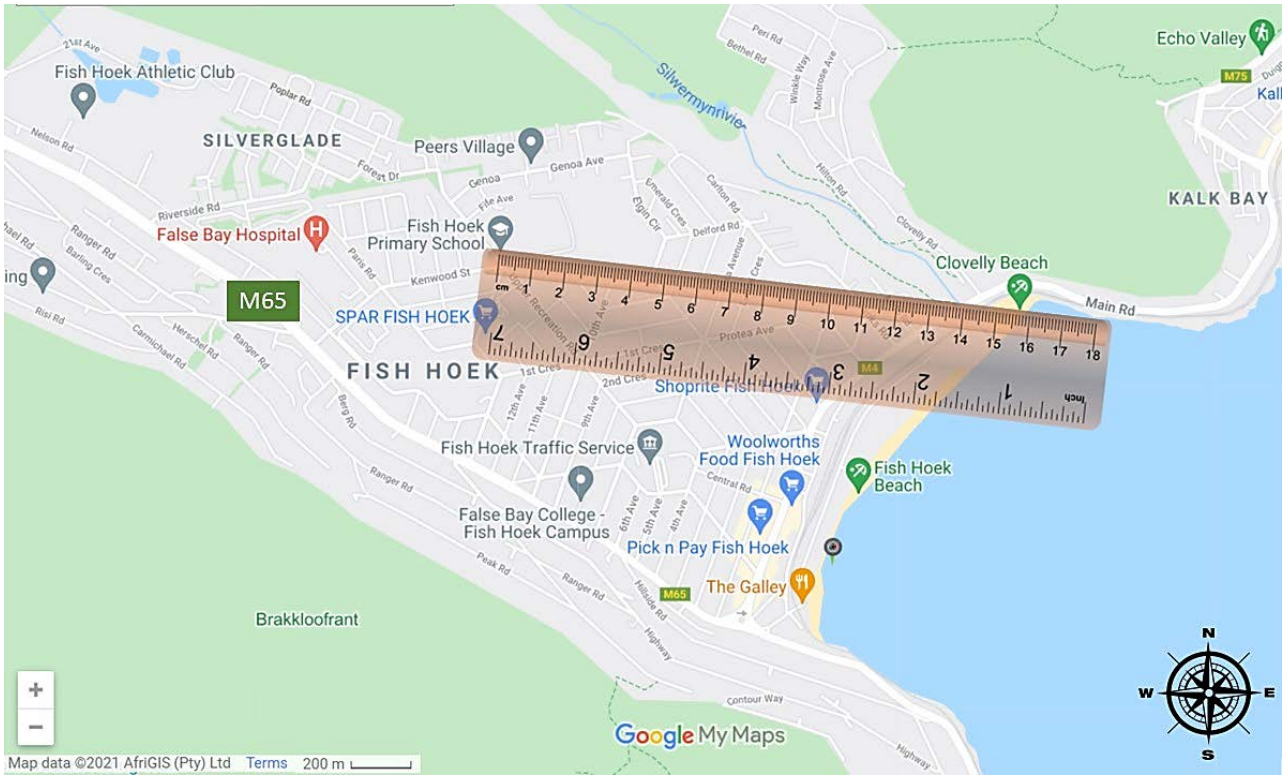
_____

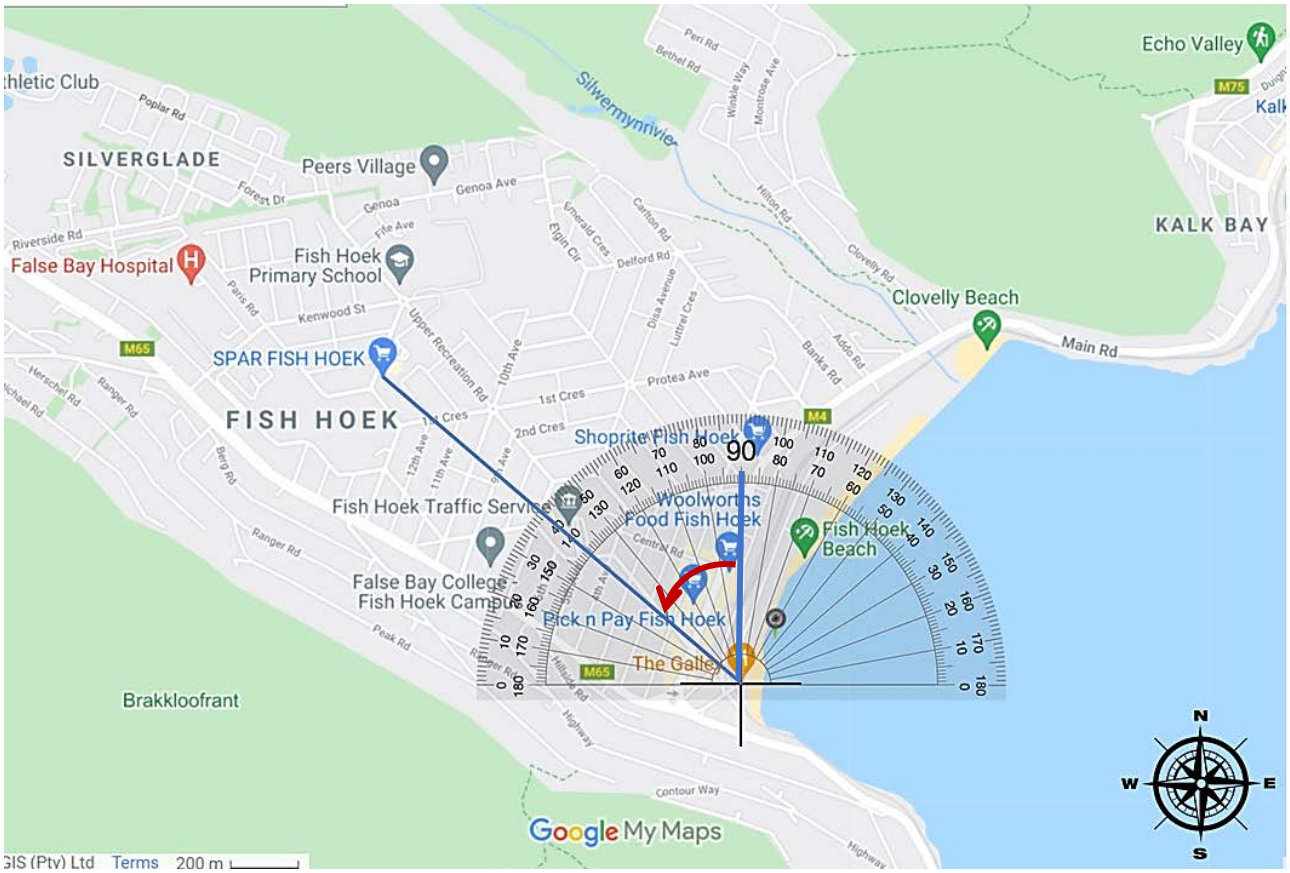
_____

(2)
[29]

QUESTION 4

Fish Hoek is a coastal suburb in the Western Cape, South Africa. The two maps below show the same view of the town of Fish Hoek.





4.1 Use the maps of Fish Hoek to answer the questions that follow:

4.1.1 Using the given ruler, estimate how many centimetres there are in one inch.

(2)

4.1.2 Measure, in cm, the distance between Fish Hoek Primary School and Clovelly Beach.

(2)

4.1.3 If the bar scale measure were 1,7 cm : 200 m, calculate (in km) the actual distance, as the crow flies, from Fish Hoek Primary School to Clovelly Beach.

(3)

4.1.4 State the compass direction from Clovelly Beach to Fish Hoek Beach.

(2)

4.1.5 If you are standing at The Galley facing North, as shown on the map, measure the angle to the Spar from the west of The Galley.

(2)

4.2 Mina sells homemade fruity ice lollies from her ice cream bike on Fish Hoek Beach.

Mina cycles from her hometown to the beach. She lives 3,6 km from Fish Hoek Beach. She travels at a speed of 13,5 miles/hour.

Use the above information to answer the questions that follow.

4.2.1 Calculate her speed in km/h if 1 mile = 1,6 km.

(2)

4.2.2 Determine, in minutes, how long it takes Mina to travel from her home to Fish Hoek Beach.

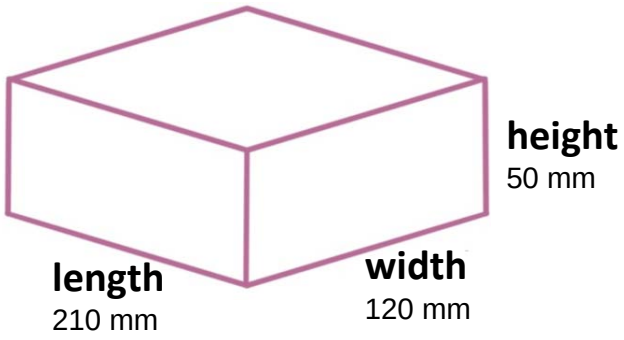
You may use the following formula:

Distance = speed × time

(3)

4.2.3 Mina must purchase dry ice for her ice cream bike. Dry ice is frozen carbon dioxide, which remains at –79 °C and costs R24/kg.

Mina purchases rectangular blocks of dry ice with dimensions 210 mm × 120 mm × 50 mm, weighing 2 kg, as illustrated below:



Use the above information to answer the questions that follow.

(a) Calculate, in mm^3, the volume of one block of dry ice.

You may use the following formula:

Volume of a rectangular prism = L × W × H

(2)

(b) Calculate (in g/mm^3 rounded to three decimal places) the weight per mm^3 of a block of dry ice.

(3)

(c) Determine the cost of the dry ice, if Mina requires 6 kg of the rectangular blocks of dry ice.

(4)

(d) The temperature of dry ice is converted to °F using the following formula.

°F = 1,8 °C + 32

(–110,2 °F) = 1,8 °C + 32

If –110,2 °F is to be converted to °C in the formula above, show the next steps in the calculation that will give an answer of –79 °C.

_____

_____

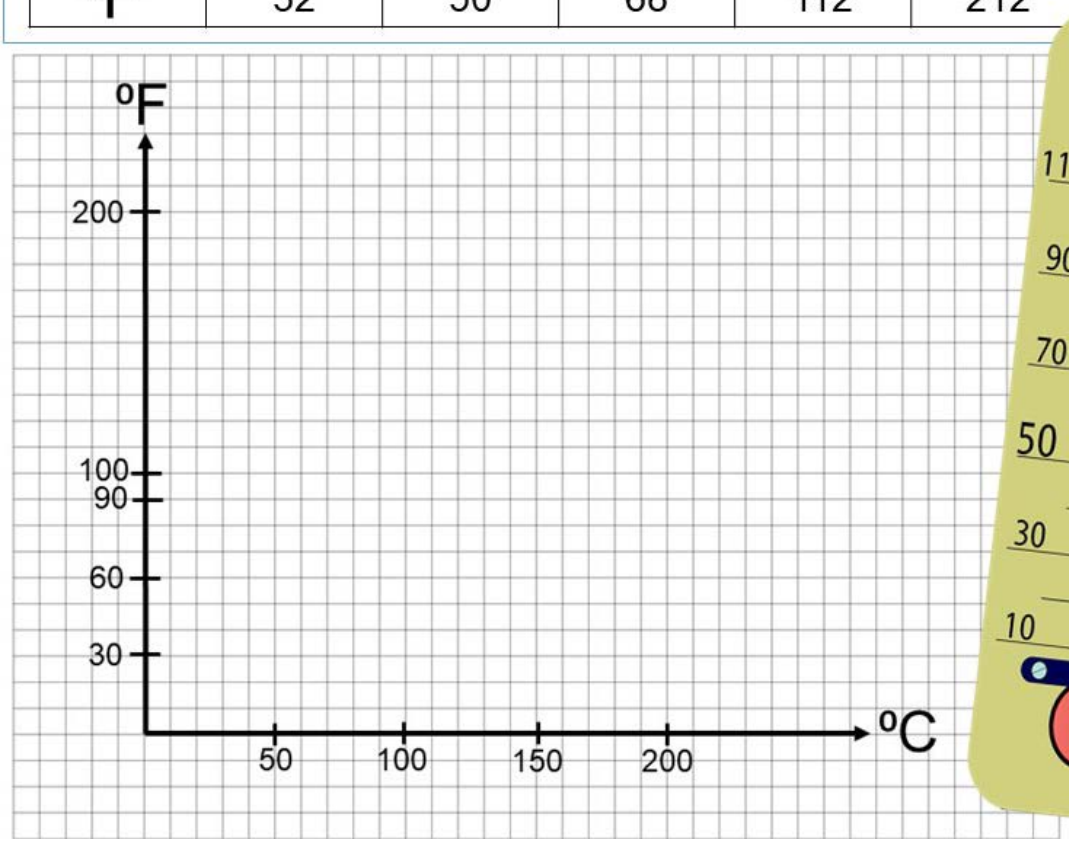
_____

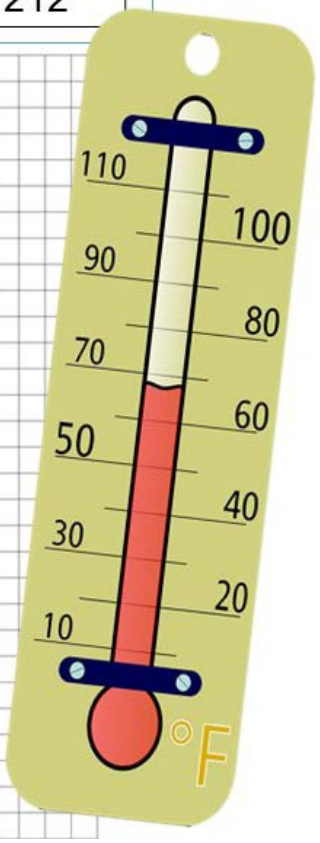
(2)

(e) On the grid below sketch a graph illustrating a comparison between degrees Celsius and degrees Fahrenheit.

Degree Celsius vs Degree Fahrenheit

°C	0	10	20	50	100
°F	32	50	68	112	212





(3)

[30]

QUESTION 5

[Resource: <https://en.wikipedia.org/wiki/Go-kart>]

5.1 The data below shows information relating to Tolamo's last race.

Track length:	240 m
Maximum speed:	65 km/h
Average lap time:	25 s
Lap record:	20,741 seconds

Use the above information to answer the questions that follow.

5.1.1 Determine how many laps Tolamo must do to cover a total distance of 1,2 km.

(3)

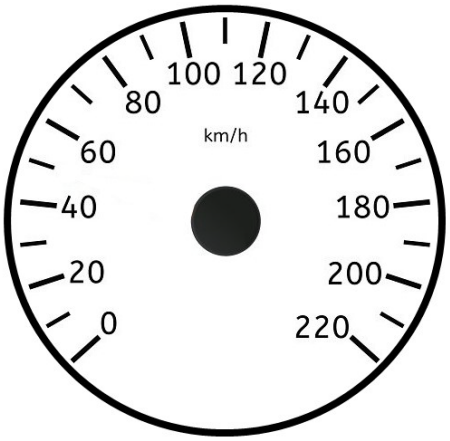
5.1.2 Using the average lap time, determine in minutes how long it will take Tolamo to cover a total distance of 1,2 km.

(2)

5.1.3 Determine, rounded to the nearest second, how much slower Tolamo drove compared to his lap record.

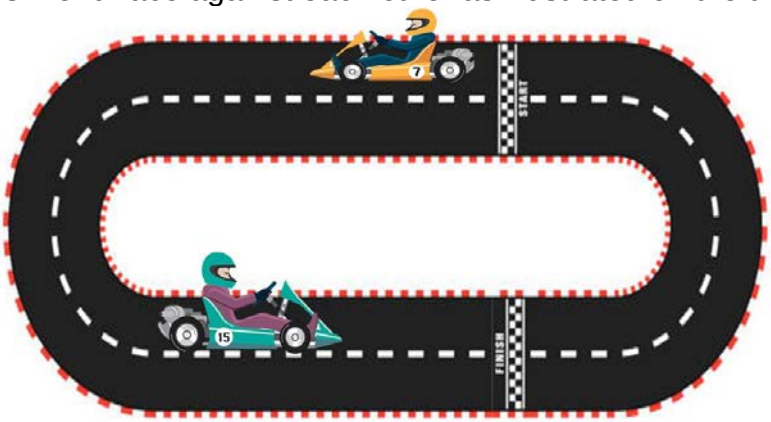
(2)

5.1.4 On the speedometer below, draw a line from the centre to indicate Tolamo's maximum speed.



(2)

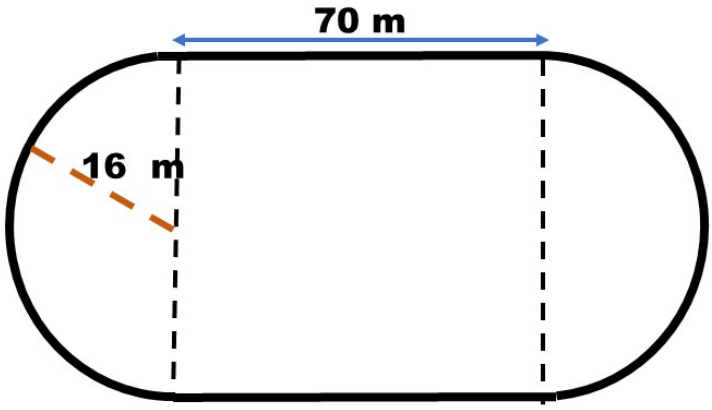
5.2 Tolamo and his friend race against each other as illustrated on the track below.



5.2.1 Both drivers start at the same time. Tolamo drives at an average speed of 65 km/h, while his friend manages only 57 km/h. After 10 laps, both finish the race and Tolamo is declared the winner. If each lap is 240 m, show that Tolamo will beat his friend by roughly 19 seconds.

(7)

5.2.2 The track is made up of a rectangular middle part with two semi-circles on either side. Some of the dimensions are provided in the diagram below:



Show that the outer perimeter is approximately 240 m.

You may use the following formula:

Circumference of a circle = $2 \times 3{,}14 \times$ radius

(3)

5.2.3 Tolamo's go-kart has a 9-litre fuel tank and uses $\frac{1}{2}$ a tank per race of 10 laps. Determine Tolamo's fuel consumption in litres/km.

(4)

5.3 Tolamo has a choice of two different-sized tyres for his go-kart. The diameters of each of the two options are given below:

5.3.1 Calculate the difference in diameter between the two tyres.

(2)

5.3.2 Calculate the number of full rotations made by Tyre A in one lap on the racetrack.

(5)

5.3.3 A set of tyres needs to be replaced after every 10 km. Determine after how many complete races (10 laps) Tolamo must replace his tyres.

(3)
[33]

Total: 150 marks

ADDITIONAL SPACE (ALL questions)

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