

# University of Fort Hare

*Together in Excellence*

MATHEMATICS CONTENT AND  
METHODOLOGY

MTH 414 E

BACHELOR OF EDUCATION

JUNE EXAMINATION

YEAR: 2023

Time: 3 HOURS

Subject: MTH 414 E

Marks: 100

This paper comprises 9 pages, including the cover page and the attachments.

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## INSTRUCTIONS

- Answer all the questions.
- Number your answers exactly as the question paper.
- Show all the calculations clearly.
- Submit attachments 1
- Use  $\pi \approx 3,14$

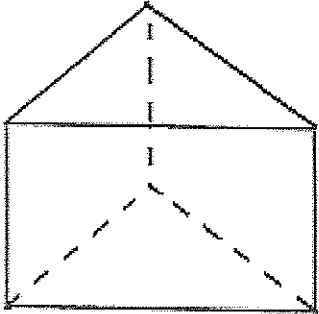
**QUESTION 1**

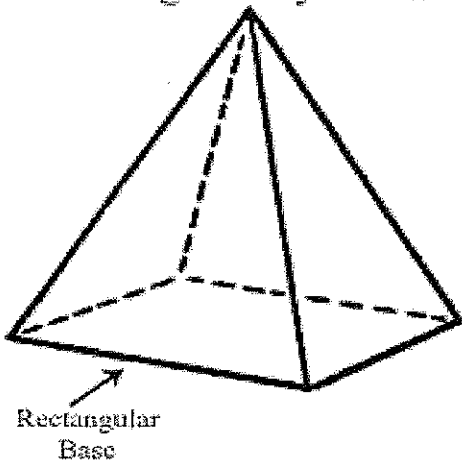
**[25]**

- 1.1 All the statements below are false. Make each statement true by providing the correct information and underlining the word (s) you changed.
  - 1.1.1 A pyramid is a polyhedron that connects a polygonal base and a vertex point.
  - 1.1.2 A prism is a polyhedron in which all cross-sections taken perpendicular to a base are identical to the base.
  - 1.1.3 A prism can have an even number of edges or odd edges, while a pyramid always has an odd number of edges.
  - 1.1.4 For a prism and a pyramid with equal bases, the number of edges of a prism and the number of edges of a pyramid are always equal.
  - 1.1.5 A pyramid has one face for each vertex, but a prism has fewer vertices than the faces.

(1x 5 = 5)

- 1.2 Visualisation is one of the levels of geometric thoughts specified by Van Hiele and skill in Mathematics. Complete the table below for the following objects:

object	faces	vertices	edges
 <p>1.2.1</p>	(i)	(ii)	(iii)

<p style="text-align: center;">Rectangular Pyramid</p>  <p>Rectangular Base</p> <p>1.2.2</p>	(iv)	(v)	(vi)
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(1 x 6 = 6)

1.3 Problem-solving is one of the teaching strategies that is used in the teaching of Mathematics.

1.3.1 Name the four steps of problem-solving as identified by Polya. (4)

1.3.2 Use the statement below to apply the four steps of Polya:

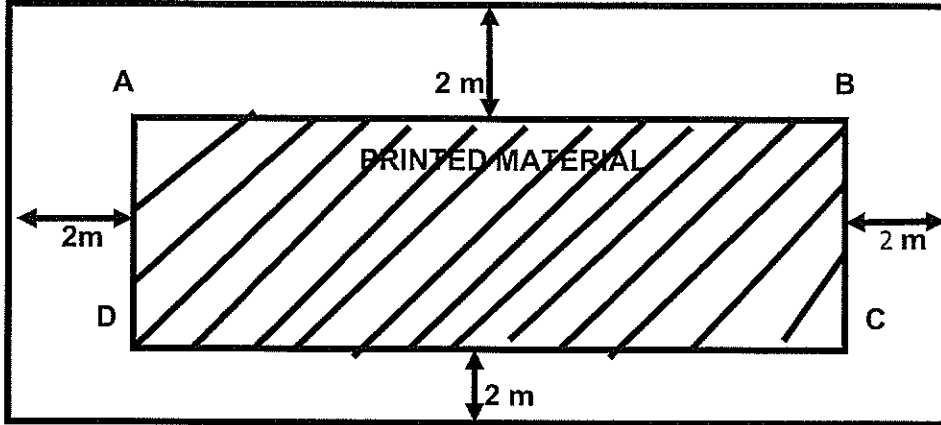
*"Lily to wants to do fencing around a circular garden with a radius of 70 m. If the fencing cost is R12 per meter, find the total fencing cost for the entire garden".*

(10)

**QUESTION 2**

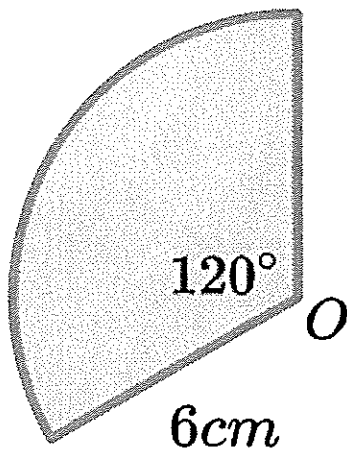
**[40]**

- 2.1 The poster has a border whose width is 2 cm on each side. If the printed material ABCD has 6 cm and 8 cm dimensions, then find the border area.



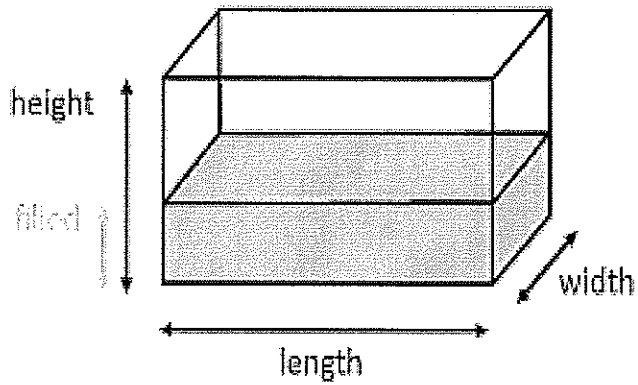
(6)

- 2.2 Find the perimeter of the sector given below. Use  $\pi \approx 3,14$

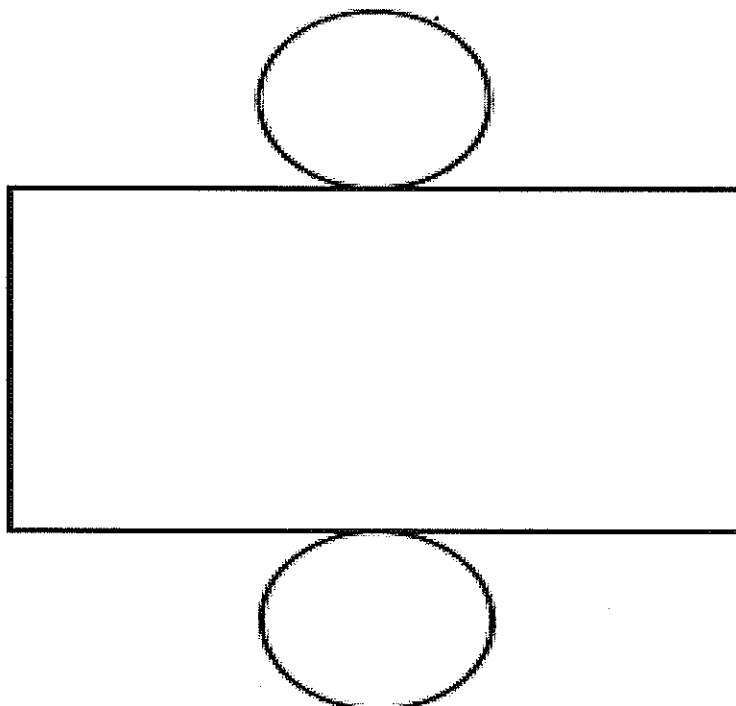


(4)

- 2.3 The open rectangular container has length = 30cm; width = 10cm and height = 15cm.

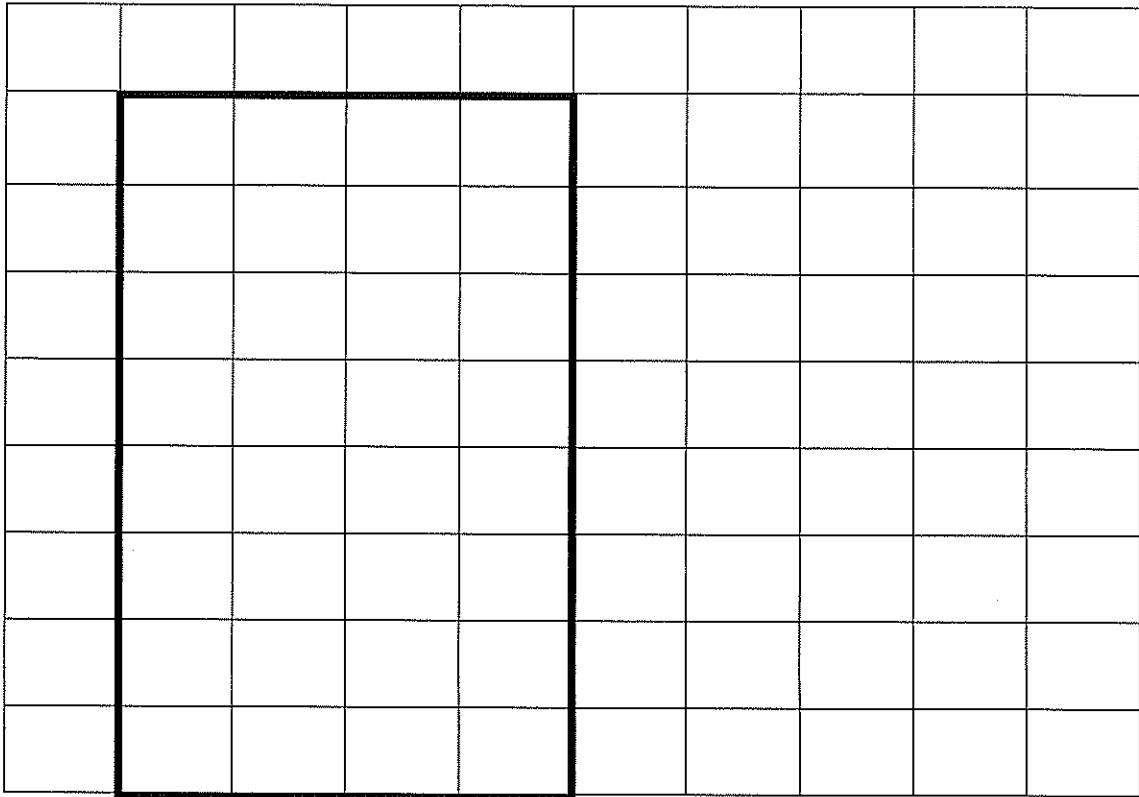


- 2.3.1 Determine the total surface area of the closed container. (8)
- 2.3.2 If the height of the water in the container is 5cm, calculate how much water is needed to fill the container to its capacity. (8)
- 2.4 Find the surface area of the cylinder with a diameter = 3, 6 cm and a height of 4 cm.



(6)

2.5 Enlargement and reduction are two concepts that were discussed in class.



2.5.1 Draw a new rectangle (use attachment 1) with a scale factor of  $\frac{1}{2}$ . Show all the dimensions of the new rectangle. Each square is 1 cm by 1 cm. (2)

2.5.2 Calculate the areas of both rectangles. (4)

2.5.3 Comparing the two areas, what conclusion(s) can you make? (2)

**QUESTION 3****[35]**

3.1 **Discuss** the importance of Data handling in the Intermediate Phase Mathematics curriculum. (6)

3.2 The language of Mathematics plays a vital role in the teaching and learning of Mathematics. Explain the mathematical meaning of the concepts **and** provide examples to illustrate your understanding.

3.2.1 Probability (2)

3.2.2 Sample space (2)

3.2.3 Event (2)

3.3 The Grade 6 class teacher demonstrated an experimental probability in a class by writing different numbers on each of 20 small pieces of paper. Numbers 1 – 20 were used. She put the pieces of paper in a box.

3.3.1 What is the probability of drawing a number which is a factor of 20? (2)

3.3.2 What is the probability of drawing a prime number? (2)

3.3.3 If the number 11 is drawn and not returned to the box, what is the probability of drawing an odd number? Leave your answer in the percentage form. (3)

3.4 An unbiased coin was tossed three times and repeated eight times.

3.4.1 Draw a tree diagram and represent the elements of a sample space. (8)

3.4.2 Hence, use your tree diagram to find the **probability** when

(i) All three tosses produce heads. (2)

(ii) The first and last tosses produce tails. (2)

3.5 A survey was conducted to determine which pupils used the school tuck shop. The results were organized in a table,

7	8	7	9	7	9	9	8
10	10	9	7	7	11	7	11
9	8	11	7	11	10	8	8
7	7	11	9	8	9	10	10
8	10	8	8	9	7	7	7

Figure 1: Tuck shop data

3.5.1 The data has been collected and presented in a table. However, it took much work for the Grade 4 learners to interpret. Organize the data in Figure 1 using the method used in class that Grade 4 learners can easily understand. (4)

ATTACHMENT 1

