

UNIVERSITY OF FORT HARE

ALICE CAMPUS

MMM 211/MAM 211/EDM 212

BACHELOR OF EDUCATION: YEAR 2

**JUNE EXAMINATION
2023**

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Subject: MATHEMATICS METHOD

Time: 3 Hours

Marks: 100

This examination paper consists of 6 pages including ONE diagram sheet

Internal Examiner: Dr Winston Hendricks

Internal Moderator: Ms N Bambiso

Instructions:

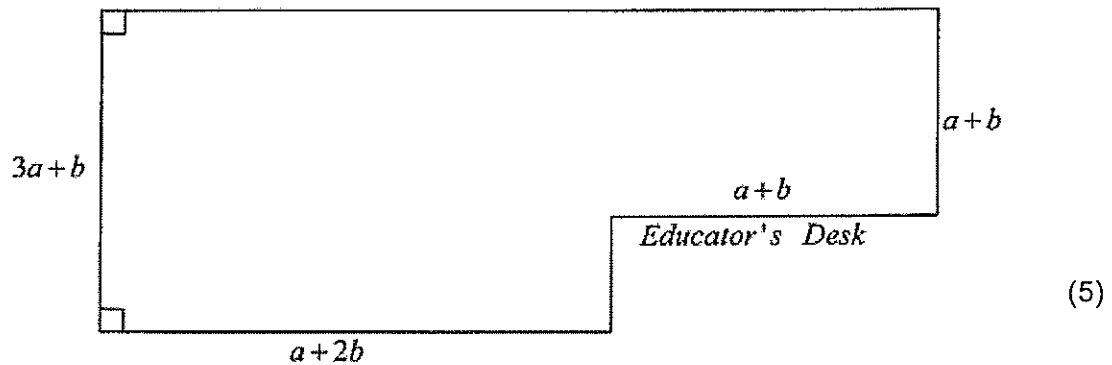
1. Answer all 6 questions
2. Use the mark allocation as a guide when responding to questions
3. Where possible, use tables, graphs or diagrams to enhance your answers
4. Write your name and student number on the ONE diagram sheet and hand it in with your answer sheet.

QUESTION 1

- 1.1 Good Mathematics performance is at times attributed to good Mathematics teaching. From your experiences as a learner, how would you characterise a good Mathematics teacher? (5)
Give FIVE characteristics and explain each characteristic briefly.
- 1.2 Mathematics is used across the curriculum in other subjects. Explain how Mathematics is integrated into other subjects and give relevant examples of how Mathematics is applied in each subject you mention. (5)
- 1.3 Constructivism is one of the new learning theories suggested in CAPS.
(a) Explain what a constructivist approach is. (2)
(b) State THREE advantages of a constructivist approach. (3)
- 1.4 A worldwide paradigm shift is taking place by which educational institutions are gradually changing from places where teaching is provided to places where learning is facilitated (Van der Walt, Maree & Ellis, 2008). Explain the above statement by comparing teacher-directed with learner-centred Mathematics classrooms. (5)
[20]

QUESTION 2

- 2.1 Mathematics is regarded as a universal part of human culture and plays a vital role in many aspects of modern life.
Name FOUR reasons, within the context of the above-mentioned statement, why all learners should pursue Mathematics. (4)
- 2.2 Consider the following action(s) by a Mathematics teacher:
“The teacher identifies and solves problems and makes decisions using critical and creative thinking” (CAPS, 2011)
- (a) Why is problem-solving in Mathematics an important part of mathematics learning? Name THREE advantages. (3)
- (b) A problem-solving strategy in Mathematics also has certain disadvantages. Name THREE disadvantages. (3)
- (c) The following problem is given to your Grade 8 class:
A general plan and dimensions of a classroom are given in the diagram on the next page, with space for the educator that has been cut out at the side.
Give an expression for the area that is available for the learners to be seated.



[15]

QUESTION 3

3.1 Ernest (1989) maintains that there are three philosophies of Mathematics, i.e., *Instrumentalist*, *Platonist*, and *Problem-solving* views of Mathematics. Explain the nature of each view. (3)

3.2 Direct/Explicit Instruction, according to Kroesbergen and Van Luit (2003), is a teacher-centred instructional approach that is most effective for teaching basic and isolated skills. Name FIVE advantages of using Direct/Explicit Instruction. (5)

3.3 For Grade 8 learners to understand how numbers work, they must understand the number system.

Use the DIAGRAMSHEET to complete the table below.
Identify the sets to which each of the following numbers belong by marking with an "X" OR leave blank in the appropriate box/es.

	Number	Natural Numbers	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Real Numbers
(a)	$-\sqrt{29}$						
(b)	0,63						
(c)	$\frac{-93}{0}$						
(d)	π						
(e)	$\sqrt{\frac{225}{1000}}$						

(5)

3.4 Show how your Grade 9 learners how to prove that:

(a) $2^{25} + 2^{25} + 2^{25} + 2^{25} = 2^{27}$ (4)

(b) $0,0\dot{6}\dot{3} = \frac{7}{111}$ (5)

[22]

QUESTION 4

4.1 Many educational psychologists have given their views on the nature of Mathematics.
Explain the theories of Vygotsky, Skemp and Dienes in relation to Mathematics. (6)

4.2 One of the purposes of teaching and learning Mathematics is to develop "*deep conceptual understandings in order to make sense of Mathematics*".

(a) What is meant by "*conceptual understanding*"? (2)

(b) Skemp (1976) distinguishes between instrumental and relational understanding of Mathematics.
Outline the MAIN difference between the two types of understanding, and mention which type develops a "*conceptual understanding*". (2)

4.3 You decide to give your Grade 7 learners a class investigation on the length of sides that determines the types of triangles. The learners have to work in groups.

(a) How would you group your learners? (2)

(b) Name and describe the THREE types of triangles according to the LENGTH of the sides. (3)

(c) Name and describe the THREE types of triangles according to the SIZE of the angles. (3)

[18]

QUESTION 5 (2)

5.1 Explain what a 'teaching method' is.

5.2 Functions is an important topic in the Grade 8 syllabus. Consider the problem below.

(a) Thembi is using a machine to measure the resistance (x) and the current (y) of an electrical circuit.

Resistance (x)	Current (y)
1	5
5	13
7	17
10	23
23	69

(a) Determine the rule which associates x and y in the table on the previous page. Write the rule as an equation. (4)

(b) Use your rule and predict what current the machine will measure in a circuit with a resistance of 127 units. (2)

(c) Which teaching methods will you, as a mathematics teacher use, to explain the concept? Give ONE reason for your answer. (2)

5.3 When concluding mathematics lessons, it is important for teachers to summarise or highlight key points of the lesson. (5)
Give FIVE advantages of summarising key points in a lesson. [15]

QUESTION 6

You plan to use "Guided Discovery" to teach your learners the graph of the straight line. (2)

6.1 What is meant by "Guided Discovery"? (3)

6.2 Guide your learners to write $y = \frac{3}{4}x + 7$ in the form of $ax \pm by = c$ where $a, b, c \in Z$ (Integers).

6.3 Your Grade 9 learners are asked to find the equation of the straight line if the line goes through $(-2; 4)$ and perpendicular to $y = -\frac{3}{5}x - 9$. Write your equation in the form of $ax \pm by = c$ where $a, b, c \in Z$ (Integers) (5)
[10]

Grand Total: 100

THE END OF YOUR QUESTION PAPER

DIAGRAM SHEET

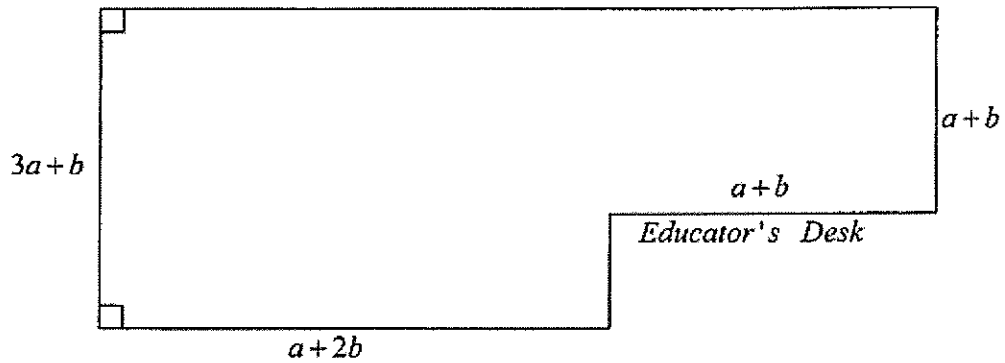
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NB: The diagram sheet must be handed in with your answer book

Student Name: _____

Student Number: _____

Question 2.2 (c)



Question 3.3

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