UNIVERSITY OF FORT HARE

ALICE CAMPUS

MMM 211

BACHELOR OF EDUCATION: YEAR 2

JUNE EXAMINATION
2025

Subject: **MATHEMATICS METHOD**

Time: 3 Hours
Marks: 100

This examination paper consists of 5 pages

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Instructions:

1. Answer all 5 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

QUESTION 1

1.1 Outline the specific aims for the teaching and learning of mathematics in South African schools, as set out in CAPS (Grade 7-9). (5)

1.2 Ernest (1989) suggests two schools of thought about the nature of mathematics.

a) Name and explain these two schools of thought. (4)

b) How does each relate to different types of mathematics classrooms? (2)

1.3 Define relational and instrumental understanding and discuss the advantages of relational teaching methodology.
Support your answer with a relevant. (6)

1.4 Identify and explain five characteristics of a good mathematics teacher. (5)

[22]

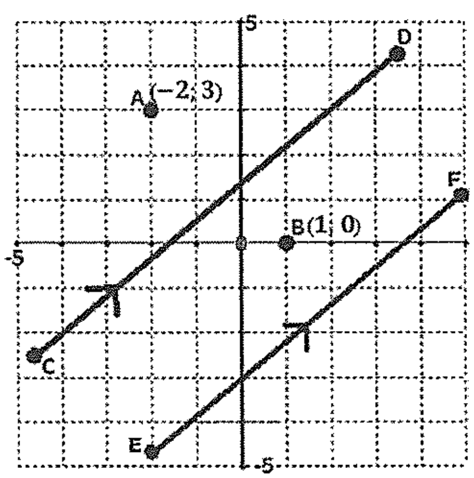
QUESTION 2

2.1 Why is problem solving in Mathematics an important part of mathematics learning? Name THREE advantages. (3)

2.2 Describe how you would introduce linear functions using a problem-based learning (PBL) approach in a Grade 9 mathematics classroom. (6)

- Provide a step-by-step example of how you would present a real-life problem related to linear functions.
- How will you facilitate group collaboration and assess learners' understanding throughout the process.

2.3 The following problem is given to your Grade 9 class:
Use the information given on the graph below to answer the questions that follow.



a) Find the gradient of the line passing through points A and B. (2)

b) Given that the line CD has a gradient of $\frac{5}{6}$.
Determine the equation of the line EF. (3)

c) Determine the equation of a line perpendicular to line CD, passing through (-2; 2). (3)

2.4 Your Grade 9 learners are asked to find the equation of the straight line if the line goes through (- 1; 3) and perpendicular to $y = -x + 2$.
Write your equation in the form of $ax \pm by = c$ where a, b, c ∈ Z (Integers). (5)

[22]

QUESTION 3

3.1 Constructivist education is based on the idea that learning occurs when learners actively participate in a process of meaning and knowledge creation rather than passively collecting information (Gray, 1997).

You are assisting Grade 7 learners in a data handling activity using a constructivist approach. Grade 7 learners collected data on the number of books they read in one month. The recorded data from 11 learners is:

2, 4, 3, 5, 6, 1, 3, 4, 2, 5, 7

a) Calculate the mean number of books from the data set. (2)

b) Determine the median number of books. (2)

c) Find the mode of the data set. (1)

d) Explain how you would guide Grade 7 learners to understand and calculate mean, median, and mode using a constructivist approach. Include how you would encourage active participation and connect the activity to learners' real-life experiences. (3)

3.2 According to CAPS Grades 7-9, assessment is such an important part of the curriculum. Consider the use of formative feedback in the teaching of data handling in mathematics.

How will the provision of timely and thorough feedback to learners facilitate their learning and address challenges encountered in understanding data handling? (5)

3.3 In the process of concluding mathematics lessons, teachers must summarize the lesson's most essential points. List FIVE benefits of summarizing important lesson points. (5)

[18]

QUESTION 4

4.1 Compare and contrast teacher-centered and learner-centered instructional approaches in mathematics education. Explain your discussion with relevant classroom examples for each approach. (6)

4.2 Assess the impact of technology in the classroom. How can educators effectively use technology to improve teaching and learning experiences? Give three (3) specific examples and discuss two (2) potential challenges. (5)

4.3 Ratios, rates and proportions are fundamental to the learning of a variety of mathematical and science disciplines (Dougherty et al., 2016). In mathematics, they are essential for acquiring concepts and abilities relating to slope, constant rate of change, and comparable figures, all of which are important to algebraic concepts and skills.

Assist your learners in providing solutions for the following questions on ratio, rate, and proportion:

a) A company has a staff ratio of 4 managers to 9 workers. If 117 people work at the company, how many are managers? (3)

b) A pump fills a 900-litre tank in 2 hours and 15 minutes. What is the rate of flow in litres per minute? (3)

c) If 5 workers can paint 3 walls in 4 hours, how long will 10 workers take to paint 12 walls, working at the same rate? (3)

[20]

QUESTION 5

5.1 Percentages help learners understand proportional reasoning, financial literacy (such as discounts and interest), and data interpretation. Provide solutions for the following percentage-based word problems.

a) A jacket originally cost R960. It is now on sale for 25% off. What is the sale price? (2)

b) The price of a cell phone increased from R3 200 to R3 680. Calculate the percentage increase. (3)

5.2 Equations lay the foundation for algebraic thinking, allowing learners to model, analyse, and solve problems involving unknown quantities—skills that are crucial across various topics in the mathematics curriculum and in everyday decision-making.

Provide full, step-by-step solutions for each equation.

a) $5(x - 2) = 3(x + 4)$ (4)

b) $\frac{2x+1}{3} - \frac{x-2}{4} = \frac{3x+5}{6}$ (5)

5.3 Sibongile is four times as old as her sister.
In 5 years, she will be twice as old as her sister.
How old is Sibongile now? (4)

[18]

Grand Total: 100

THE END OF YOUR QUESTION PAPER