UNIVERSITY OF FORT HARE

ALICE CAMPUS

MMM 411/MTM412

BACHELOR OF EDUCATION: YEAR 4

JUNE EXAMINATIONS

2025

Subject: MATHEMATICS METHOD

Time: 3 Hours
Marks: 100

This paper consists of 12 pages including the cover page and 4 diagram sheets

Examiner: Assoc Prof WW Hendricks

External Moderator: Prof ZM Jojo

Instructions:

1. Answer all 6 questions
2. Use the mark allocation as a guide when giving responses
3. You will require a scientific calculator and a mathematics set
4. Answers should be rounded off to TWO decimal places where applicable
5. Where possible, use tables, graphs or diagrams to enhance your answers
6. Write your name and student number on the diagram sheets and hand it in with your answer sheet

DO NOT TURN THE PAGE BEFORE BEING TOLD TO DO SO

QUESTION 2

2.1 Explain what a teaching method is.
Give ONE REASON why it is important to use different teaching methods in the Mathematics classroom. (2)

2.2 Briefly explain the following three teaching methods and give ONE ADVANTAGE of each:

(a) Direct/Explicit teaching (2)

(b) Cooperative learning (2)

(c) Investigations (2)

2.3 One example of a 'Direct/Explicit Teaching Method' in Quadratic Theory is to show Grade 11 learners how derive to the quadratic equation if the roots ($r_1$and r_2) are given. The following theory is teaching directly to your learners:

If the roots of a quadratic equation are r_1 and r_2 where r_1 is the first root and r_2 is the second root then:
$x = r_1$ or $x = r_2$
$(x - r_1)(x - r_2) = 0$
which is: $x^2 - (r_1 + r_2)x + r_1.r_2 = 0$

(a) If $r_1 = \frac{-b+\sqrt{b^2-4ac}}{2a}$ and $r_2 = \frac{-b-\sqrt{b^2-4ac}}{2a}$ show your learners that $r_1 + r_2 = \frac{-b}{a}$. (3)

(b) If $r_1 = \frac{-b+\sqrt{b^2-4ac}}{2a}$ and $r_2 = \frac{-b-\sqrt{b^2-4ac}}{2a}$ show your learners that $r_1 \times r_2 = \frac{c}{a}$. (3)

(c) Hence show your learners how do you derive the quadratic equation of $ax^2 + bx + c = 0$. (3)

2.4 Using a 'problem-solving activity' with your learners the following problem is posed to them:

If the roots of a quadratic equation is $x = 4 \pm \sqrt{5}$, now determine the quadratic equation in the form $ax^2 + bx + c = 0$.

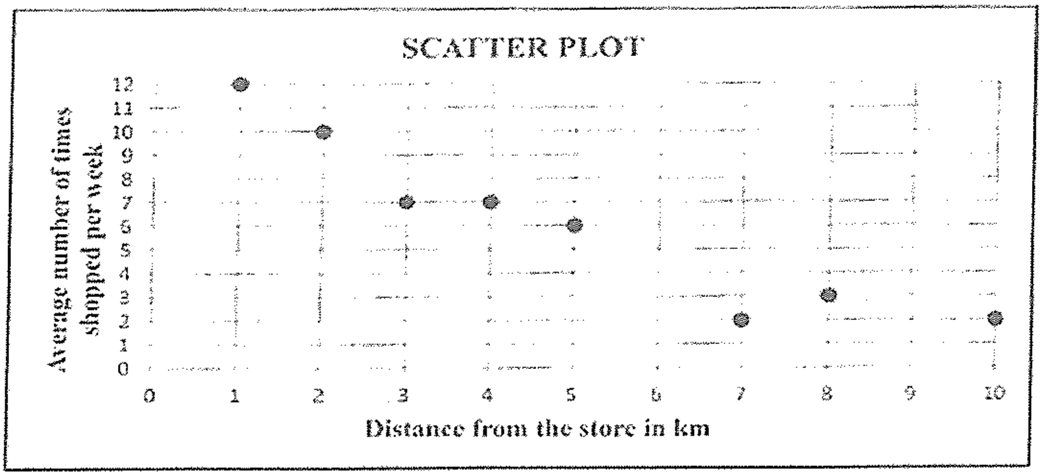
(a) Solve the problem by using $x^2 - (r_1 + r_2)x + r_1.r_2 = 0$ (3)

(b) Hence use the equation in (a) and show your learners that the roots of the equation could NOT be determined by factorisation. (3)

2.5 Problem-solving is an important method to use in the Mathematics classroom. Outline THREE ADVANTAGES that a problem-solving method might have.

(3)
[26]

Distance from the store in km	1	2	3	4	5	7	8	10
Average number of times shopped per week	12	10	7	7	6	2	3	2



(a) Use the scatter plot to comment on the <u>strength of the relationship</u> between the distance a shopper lived from the store and the average number of times she/he shopped at the store in a week. (1)

(b) Calculate the correlation coefficient of the data. (1)

(c) Calculate the equation of least regression line of the data. (3)

(d) Use your answer in (c) to estimate the average number of times that a shopper living 6 km from the supermarket will visit the store in a week. (2)

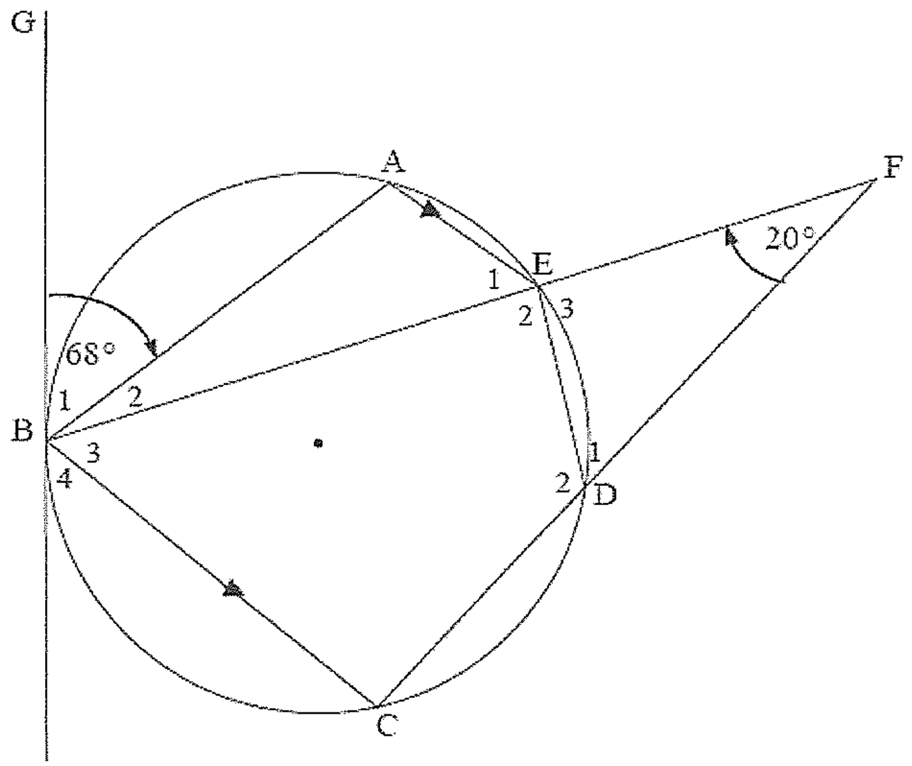
(e) Sketch the least squares regression line on the scatter plot provided on <u>DIAGRAM SHEET 3.</u> (2)

4.3 Learners in poorly resourced schools always face serious challenges when completing assessment tasks which are of an inquiry-based nature i.e. investigations and assignments.
Suggest TWO WAYS how, as a Mathematics teacher, would overcome these challenges when learners cite the lack of resources as a major problem to complete your tasks effectively. (2)

[14]

Show your Grade 11 learners how they should use proven theorems to solve problems in Geometry by solving the problem below.

In the diagram, A, B, C, D and E are points on the circumference of the circle such that AE | | BC. BE and CD produced meet in F. GBH is a tangent to the circle at B. $\hat{B}_1$ =68° and $\hat{F}$ = 20°. A separate diagram is provided on <u>DIAGRAM SHEET 4.</u>



(a) Complete the following statement:

The angle between the tangent and the chord at the point of contact is equal to ... (1)

Determine the size of each of the following angles. Give reasons.

(b) $\hat{E}_1$ (2)

(c) $\hat{B}_3$ (1)

DAIGRAM SHEET 1

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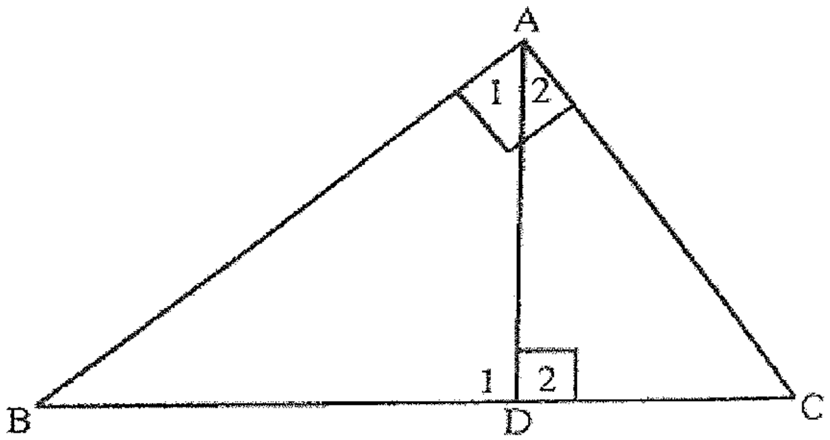
NB: The diagram sheets must be handed in with your answer book

Student Name: ____

Student Number: ____

Question 1.3 (b)



DAIGRAM SHEET 3

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Student Name: ______________________________
Student Number: ______________________________

Question 4.2 (e)

Distance from the store in km	1	2	3	4	5	7	8	10
Average number of times shopped per week	12	10	7	7	6	2	3	2