



EXAMINATION NO.: _____ THE MALAWI NATIONAL EXAMINATIONS BOARD

2025 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

ADDITIONAL MATHEMATICS

Subject Number: M132/I

Monday, 21 July

Time Allowed: 2 h 30 min
8:00 – 10:30 am

PAPER I

(100 marks)

Instructions

1. This paper contains 15 printed pages.
Please check.
2. Write your Examination Number on top of each page of this question paper.
3. Answer all the seven questions in Section A and any two questions from Section B.
4. The graph paper provided at the end of the question paper can be used if required.
5. Only non programmable calculators may be used.
6. All necessary working should be shown and any numerical expression being evaluated by calculators must be clearly stated; otherwise marks for method may be lost.
7. The final answer to a question requiring the use of calculators should normally be given to three significant figures.
8. The marks allocated to each question (or part of a question) are shown in brackets at the end of each question (or part of a question).
9. In the table provided on this page, tick against the question number you have answered.
10. Hand in your question paper to the invigilator when the time is called to stop writing.

Question Number	Tick if answered	Do not write in these columns
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
Total		

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Section A (60 marks)

Answer all the **seven** questions in this section in the spaces provided.

1. a. Evaluate the $\lim_{x \rightarrow 2} \frac{2x^2 - 5x + 2}{x - 2}$. **(4 marks)**

- b. In the expansion of $(1 + x)^n$, in ascending powers of x , the coefficient of the 3rd term is 15. Calculate the values of n . **(6 marks)**



2. a. Evaluate $\int_0^{\frac{\pi}{6}} \sin\left(2x + \frac{\pi}{6}\right) dx.$ (6 marks)

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- b. Solve the inequality $|3x - 4| < 4 - x.$ (5 marks)

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3. a. Find the equation of the tangent to the curve $y = \frac{x^2 + 2x}{x^2 - 3}$ at the point $x = 2$.

(6 marks)

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b. Given that $P(x) = \frac{2x+3}{5x-2}$, find $P^{-1}(-2)$. (7 marks)

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4. Figure 1 shows a curve whose equation is $y = 4 \cos 2x$.

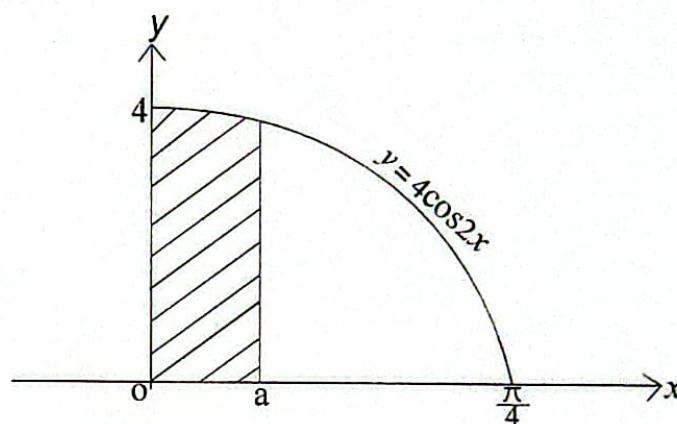


Figure 1

Given that the area of the shaded part is 1 square unit, find the value of a .

(6 marks)



5. Solve the equation $2\csc^2 \theta + 8 \cot \theta = 0$ for $0^\circ \leq \theta \leq 360^\circ$. (7 marks)

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6. Given that $y = \sqrt{5x^2 + 3}$, find the value of $\left(\frac{dy}{dx}\right)^2$ when $x = -1$. (6 marks)

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7. By using a table, find the range of values of x that satisfy the inequality $x^2 + 3 \geq 2x$. (7 marks)

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Section B (40 marks)

Answer any **two** questions from this section in the spaces provided.

8. a. The term containing x^2 in the expansion of $\left(1 + \frac{p}{2}x\right)^8$ is equal to the constant term in the expansion of $(2x+3)^4$. Calculate the values of p .

(8 marks)



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8. (Continued)

- b. Figure 2 shows a metal plate PQRST in the form of a rectangle combined with an isosceles triangle such that P is above midpoint of TQ, $PT = PQ = 4$ units, $TS = QR = 2$ units and angle $PTQ = \text{angle } PQT = x$ radians.

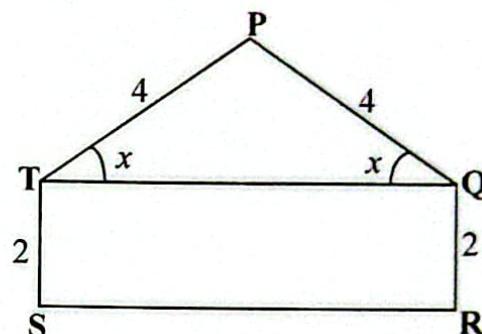


Figure 2

- (i) Show that the area, A of the plate is given by
 $A = 16 \cos x + 16 \sin x \cos x$.

(4 marks)

8. (Continued)(ii) Calculate the maximum value of A. **(8 marks)**

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9. a. Prove that $\frac{\tan x}{1 + \sec x} + \frac{1 + \sec x}{\tan x} \equiv 2 \cosec x$. (10 marks)

9. (Continued)

- b. Find the coordinates of the turning points on the curve $y=x^3-6x^2+9x+10$ and classify them. **(10 marks)**

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10. a. Functions f and g are defined by $f: x \rightarrow \frac{3x+11}{x-3}$, $x \neq 3$ and $g: x \rightarrow \frac{x-3}{2}$.

Given that $f(x) = g^{-1}(x)$, find the value of x . (10 marks)



10. (Continued)

- b. (i) Using a scale of 2 cm to represent 30° on the horizontal axis and 2 cm to represent 1 unit on the vertical axis, draw on the same axes, the graphs of $y = -2 \cos x$ and $y = \sin 2x$ for $0^\circ \leq x \leq 360^\circ$ on the graph paper provided on page 15.

(8 marks)

- (ii) Use the graphs to solve the equation $-2 \cos x - \sin 2x \geq 0$.
(2 marks)

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10. (Continued)

b. (i)

END OF QUESTION PAPER

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