EXAMINATION NO.:_____

THE MALAWI NATIONAL EXAMINATIONS BOARD

2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

MATHEMATICS

Subject Number: M131/I

Thursday, 11 July

Time Allowed: 2 hours
8:00 – 10:00 am

PAPER I

(100 marks)

Instructions

1. **This paper contains 14 printed pages. Please check.**
2. Answer **all** the **20** questions in this paper.
3. The maximum number of marks for each answer is indicated against each question.
4. Scientific calculators may be used.
5. The graph paper and the blank answer sheet at the end of the question paper can be used if required. Do **not** tear them off.
6. **All working must be clearly shown.**
7. Write your **Examination Number** at the top of each page of your question paper in the spaces provided.
8. In the table provided on this page, **tick** against the question number you have answered.
9. At the end of the examination, hand in your paper to the invigilator.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
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Answer **all** the **twenty** questions in the spaces provided.

1. Without using a calculator, simplify $\frac{6}{\sqrt{32}}$, leaving the answer with a rational denominator. **(4 marks)**

2. Factorise completely $10 + 8m - 24m^2$. **(4 marks)**

Continued/…

3. Make k subject of the formula $x = \frac{b - k^3}{k^3}$. **(5 marks)**

4. Given that $g(x) = \frac{2\sqrt{x}}{3} + 1$, calculate the domain when the range is 6. **(5 marks)**

Continued/…

5. **Figure 1** is a circle **ABCD** with centre **O** in which **BC** = **CD** and angle **DAB** = 52°.

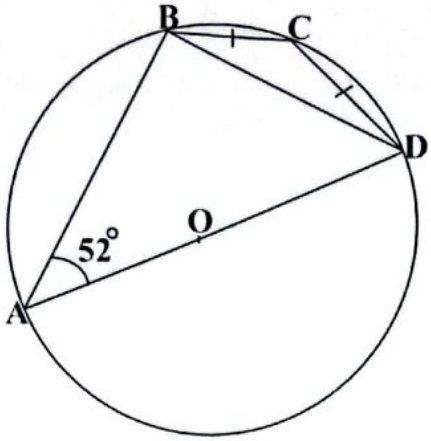

Figure 1

Calculate the value of angle **ABC**. **(5 marks)**

6. Given that $\underline{a} = \begin{pmatrix} 2 \\ 6 \end{pmatrix}$ and $\underline{b} = \begin{pmatrix} -8 \\ 3 \end{pmatrix}$, find the value of $\frac{1}{2}(\underline{a} - \underline{b})$. **(4 marks)**

7. The gradient of a line joining two points **B** = (4, 2*b*) and **C** = (6, - 8) is 7.
Find the value of *b*. **(4 marks)**

Continued/…

8. When a polynomial $x^3 + 5x^2 - 4x + k$ is divided by $(x-2)$, the remainder is $5k$. Calculate the value of k. **(5 marks)**

9. The quantity w varies directly as v and the square of u. When $w = 24$, $u = 2$ and $v = 3$. Find the value of u when $w = 63$ and $v = 3.5$. **(6 marks)**

Continued/...

10. **Figure 2** shows a circle **KLMN** with centre **O**. Chords **KM** and **LN** intersect at right angles such that **OP** = 3 cm, **PM** = x cm and **LN** = 8 cm.

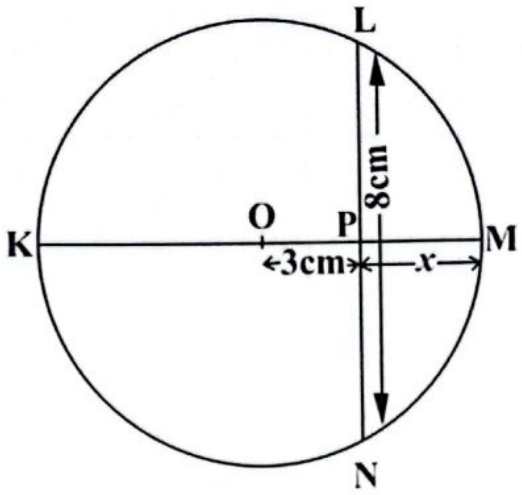

Figure 2

Calculate the value of x. **(5 marks)**

11. Solve the equation $3x^2 + 6x - 2$, giving the answer correct to three significant figures. **(6 marks)**

Continued/...

12. **Figure 3** shows unshaded region **(M)** bounded by **three** inequalities.

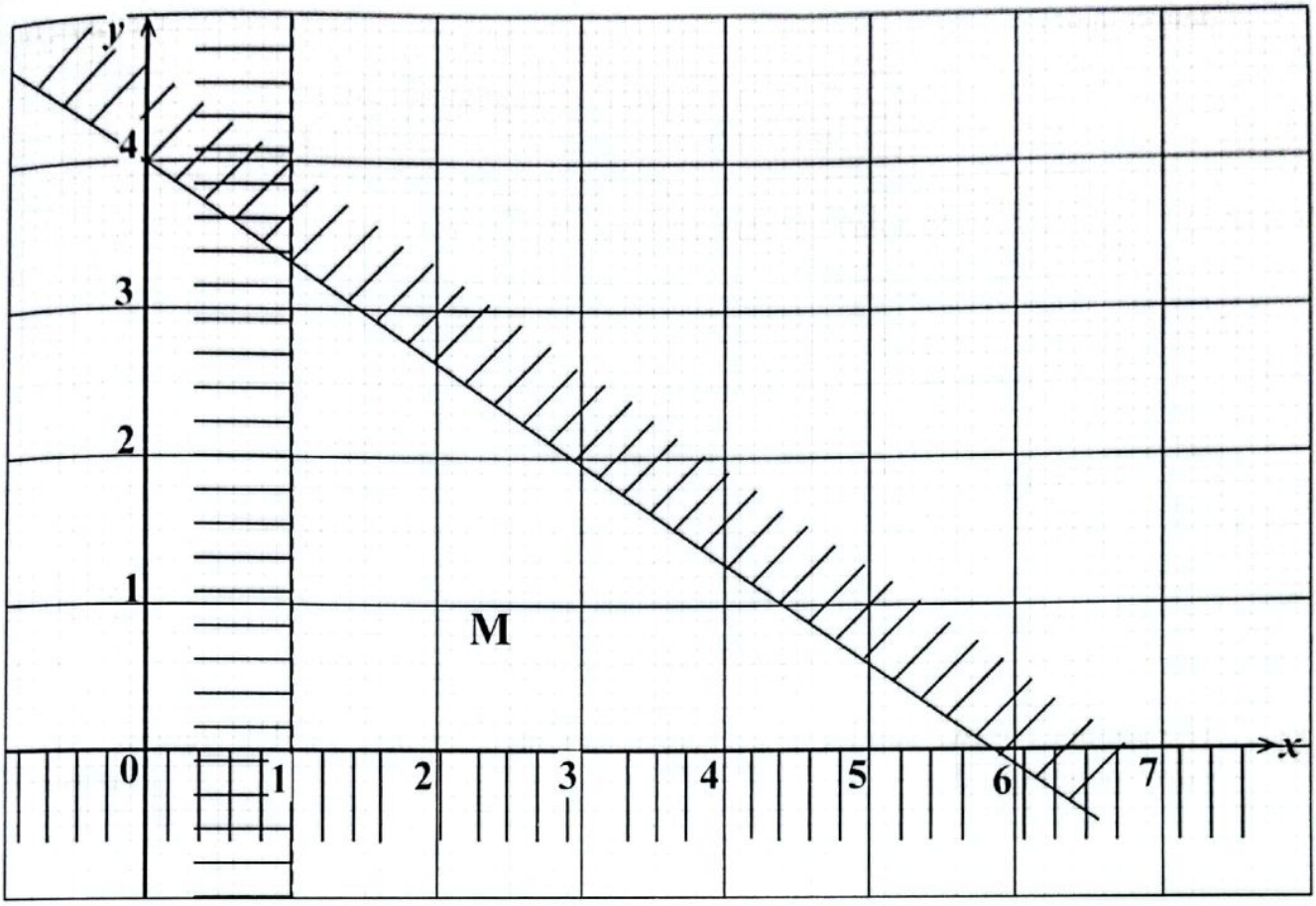

Figure 3

Write down the **three** inequalities. **(6 marks)**

13. Without using a calculator, simplify $\frac{\tan 30^0}{\cos 60^0}$ leaving the answer with a rational denominator. **(5 marks)**

14. The volumes of two similar objects are 56 cm^3 and 189 cm^3. Find the ratio of their corresponding sides. **(5 marks)**

Continued/…

15. The **table below** shows a frequency distribution of books owned by students at a certain school.

Number of books	4	8	x	7
Frequency	2	5	3	1

If the mean number of books was 11, calculate the value of x. **(5 marks)**

16. The fourth term of a geometric progression (**GP**) is 3 and the ninth term is 96. Calculate the common ratio. **(5 marks)**

Continued/…

17. **Figure 4** is a solid object made of a cylinder of height 10 cm, radius 3 cm and a cone whose slanting height is 5 cm.

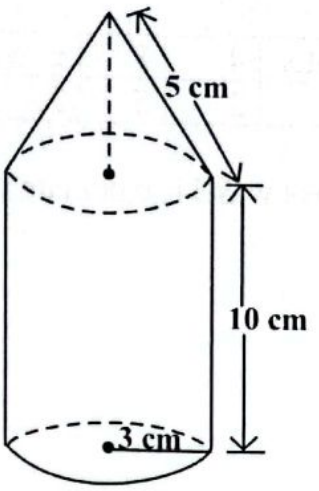

Figure 4

Calculate the volume of the object. **(7 marks)**

18. Point **M** is translated into **M'** (-1, 4) of point **M**. If **M'** is 7 units up and 2 units left, calculate the coordinates of point **M**. **(4 marks)**

19. Given that $\frac{1}{2}\begin{pmatrix} 4 & 6 \\ -8 & 0 \end{pmatrix} - \begin{pmatrix} 2 & a+3 \\ 6 & -1 \end{pmatrix} = \begin{pmatrix} 0 & 5 \\ -10 & 1 \end{pmatrix}$, calculate the value of a.

(4 marks)

Continued/…

20. **Figure 5** shows a velocity - time graph of a moving object.

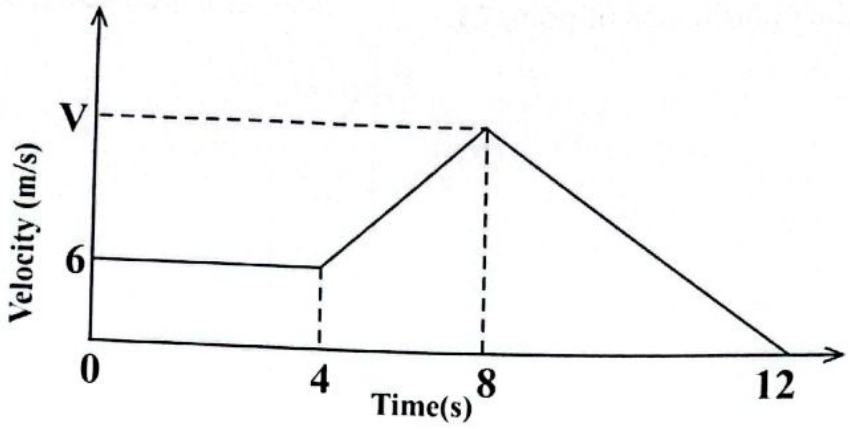

Figure 5

Given that the total distance covered is 84 metres, calculate the deceleration of the object.

(6 marks)

END OF QUESTION PAPER

NB: This paper contains 14 printed pages.