NAME OF STUDENT……Form 4

MAKINA CLASSES

2025 MALAWI SCHOOL CERTIFICATE OF EDUCATION MID TERM EXAMINATION

MATHEMATICS

PAPER I

Thursday, 27 November.

(100 marks)

Subject number: M131/I
Time Allowed: 2 hours
07:30 – 09:30 am

Question number	Tick if answered	Do not write in these columns	
1			
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Instructions

1. **This paper contains 9 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 blank answer sheet at the end of the question paper can be used if required. Do **not** tear it off.
6. **All working must be clearly shown.**
7. Write your **name** and tick your class on top of each page of this question paper.
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.

Turn over

Answer **all** the **twenty** questions in the spaces provided

1. Factorize $5x^2 - 13x - 6$ completely. **(3 marks)**

2. Rationalize the denominator of $\frac{\sqrt{5}}{\sqrt{5}+3}$, give your answer in simplest form **(4 marks)**

3. Make v in $m = \sqrt[3]{\frac{3v}{4\pi}}$, the subject the of the formula **(4 marks)**

4. **Table 1** below shows frequencies of different class intervals of ages of students in years.

Class interval	10	20	30	40
Frequency	5	10	17	13

Calculate the standard deviation of the students' ages to one decimal place. **(7 marks)**

5. Simplify $\frac{2^{n+2}-2^{n+1}}{2^n}$, leave your answer in simplest form. **(4 marks)**

6. The sum of n terms of a Geometric Progression **(GP)** $3^n - 1$. Find the first term and the common ratio of the progression. **(4 marks)**

7. Show that $x - a$ is a factor of $-3x^3 + 4ax^2 - x^3$ **(4 marks)**

8. Solve the following simultaneous equations: **(7 marks)**

$$x + y = 0$$
$$xy - y^2 = -8$$

9. Solve the equation $9 - x - 3x^2 = 0$ **(6 marks)**

10. Given that $\log 3 = 0.477, \log 5 = 0.699$ find $\log(\sin 120°)$ **(5 marks)**

11. Prove that the opposite angles of a cyclic quadrilateral are supplementary **(6 marks)**

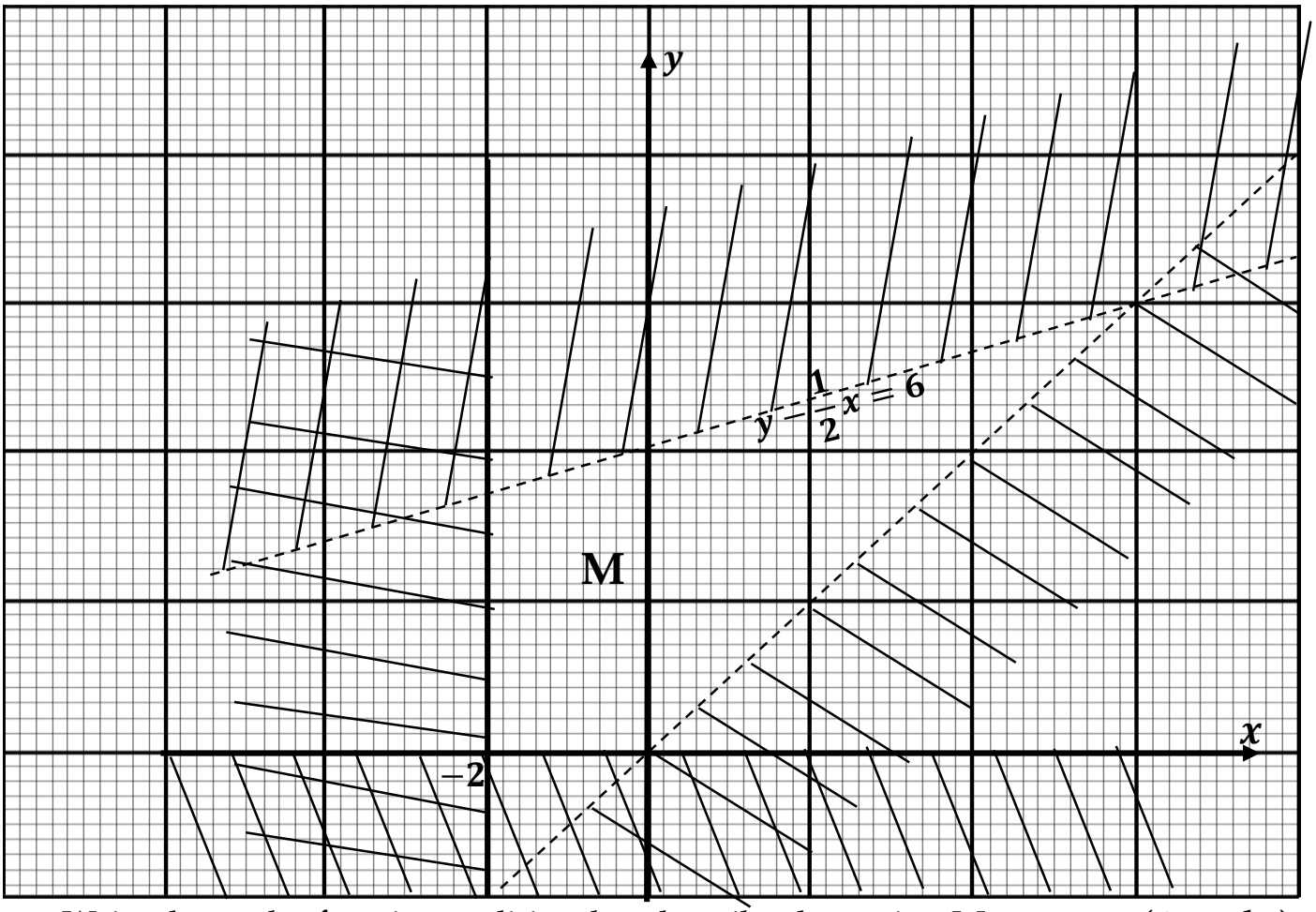
12. Given that $f(x) = \sqrt{\frac{x-3}{x+3}}$, find the value of x for which $f(x) = \frac{1}{2}$ **(5 marks)**

13. Given that **A**$(a, -1)$ and **B**$(5, 3)$. If $|AB| = 5$ units, find the smaller value of a. **(6 marks)**

14. Given a matrix $\mathbf{P} = \begin{pmatrix} a-2 & 1 \\ 3 & -1 \end{pmatrix}$, $\boldsymbol{Q} = \begin{pmatrix} 2-a & 0 \\ 4 & 3 \end{pmatrix}$. If $\boldsymbol{Q} - \boldsymbol{P} = \begin{pmatrix} 0 & -1 \\ 1 & 4 \end{pmatrix}$, find the value of a. **(5 marks)**

15. The ratio of areas of two similar circles is 36: 100. Given that the radius of the smaller circle is 13cm, calculate the radius of the bigger circle. **(4 marks)**

16.Figure 1 shows unshaded region **M** bounded by four inequalities.



Write down the **four** inequalities that describe the region **M.** **(6 marks)**

17. Given that $\sqrt[y]{x} = x$, show that $y = 1$ **(4 marks)**

18. Given that $x+2, x+3, 2x^2+1$ are three consecutive terms of an A.P, find the possible values of x. **(6 marks)**

19. Evaluate $2\log_6 3 + \log_6 12 + \log_6 8 - \log_6 24$ **(6 marks)**

20. The roots of a quadratic equation $x^2 + bx - c = 0$ are $x = \sqrt{2}$ and $x = -\sqrt{2}$. calculate the values of b and c. **(4 marks)**