EXAMINATION NUMBER:_____

CENTRAL EAST EDUCATION DIVISION

2023 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

MATHEMATICS

(100 marks)

Wednesday, 22nd March 2023 **Subject Number: M131/1**

PAPER I **Time allowed: 2 hours**

(8:00 a.m. – 10:00 a.m.)

Instructions

1. **This paper contains 16 pages. Please check.**
2. Answer **all** the **20** questions in this paper.
3. The maximum number of marks for each answer is indicate against each question.
4. Write your answers in the spaces provided on the question paper.
5. Scientific calculators may be used.
6. **All working must be clearly shown**
7. Make sure you write your examination number in the spaces provided.
8. In the table provided on this page, **tick** against the question number you have answered.

Question Number	Tick questions answered	Do not write in these columns	
1			
2			
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TURN OVER

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1. Factorise completely $(x-y)^2-y^2$ **(3 marks)**

2. Quantities ***a***, *b* and ***c*** are related such that ***a*** varies directly as ***b*** and inversely as the square of ***c***. When a = 24 and b = 3, c = 4. Find the value of a when b = 4 and c = 8. **(5marks)**

3. Given that $f(x) = \frac{-x+7}{3}$, evaluate f(-8) **(3marks)**

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4. Figure 1 shows unshaded region P bounded by four inequalities

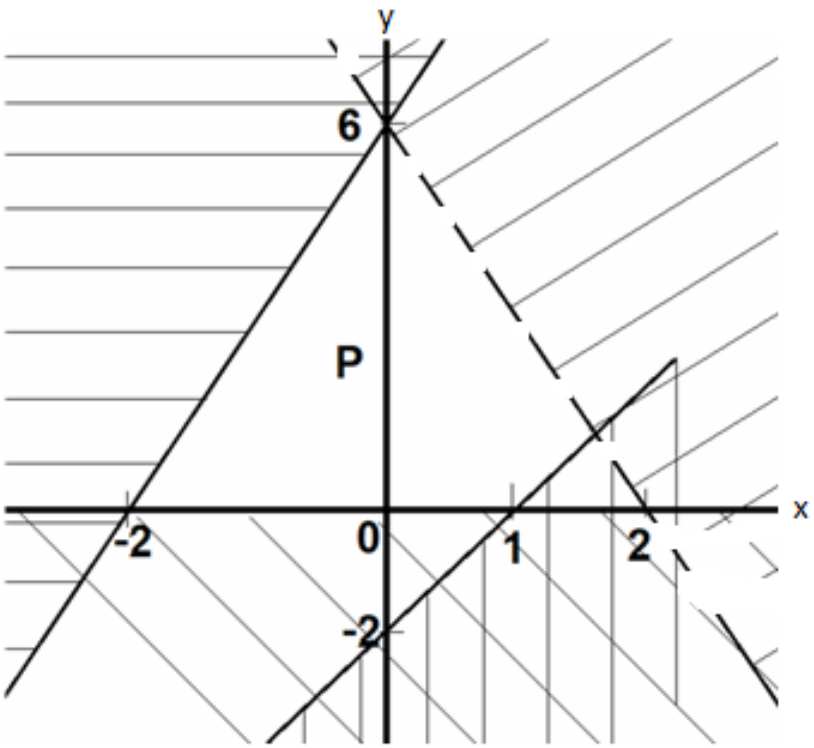

Figure 1

Write down the four inequalities that define region **P**.
(7 marks)

5. Simplify $\sqrt{150} - \sqrt{24} + \sqrt{294}$ **(4marks)**

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6. Given that $R = \sqrt{\frac{ax-p}{bx}}$, make ***x*** the subject of the formula. **(6 marks)**

7. Find the equation of a straight line that passes through a point (-3, 2) and is parallel to line 2(y-2x) = 3. **(5marks)**

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8. Given that the mean of five numbers 8, 7, 3, 5 and ***k*** is 6. Calculate the value of ***k***. **(4marks)**

9. **Figure 2** shows circle BCDE with Centre O. Angle BED = 70^0, angle BDC = 37^0 and angle OBE = 25^0

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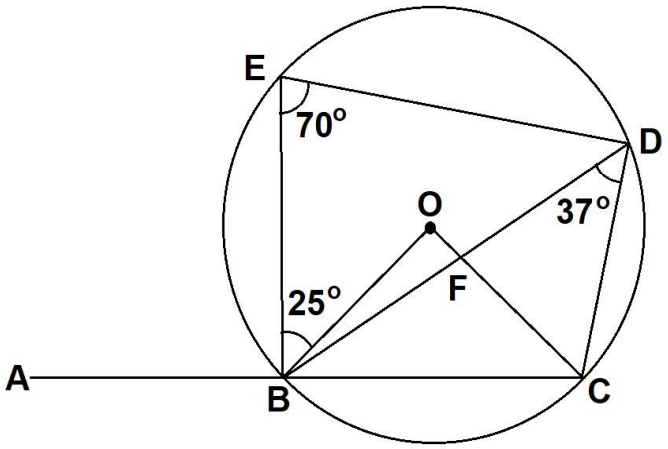

Figure 2

Calculate angle OCD
(5 marks)

10. Solve for x in the equation $log_2(x + 3) = 2 - log_2 x$ **(5 marks)**

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11. Given that Matrix $M = \begin{pmatrix} 0 & -10 \\ 2 & 6 \end{pmatrix}$ and $N = \begin{pmatrix} 2 & 5 \\ -4 & 0 \end{pmatrix}$, find $\frac{1}{2}M - N^2$

(5 marks)

12. In a Geometric Progression, the sum of the second term and third term is 9. If the seventh term is eight times the fourth term. Find the tenth term of the progressions (**7 marks**)

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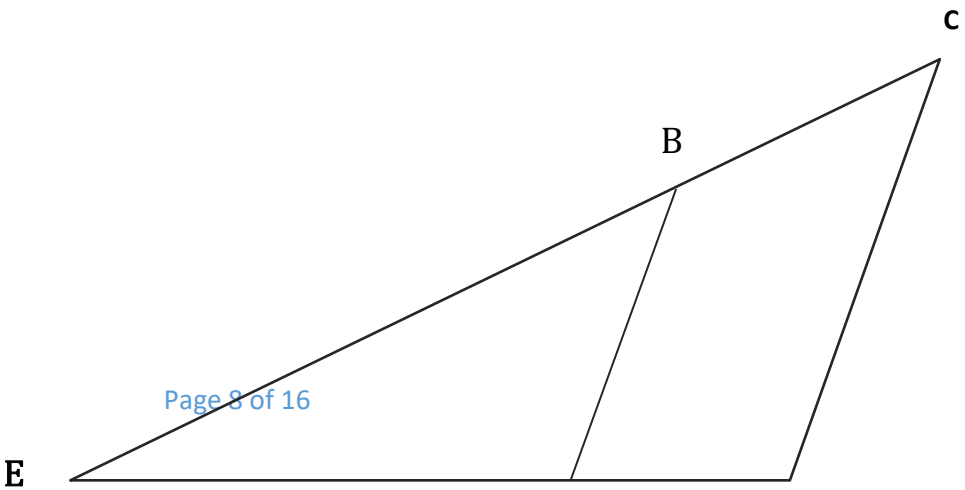
13.**Figure 3** shows two similar triangles AEB and CED. $\mathrm{EA} = 4\ cm$ and $\mathrm{AD} = 2\mathrm{cm}$



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If the area of triangle AEB is $10cm^2$, find the area of triangle CED. **(5 marks)**

14. A car accelerates uniformly from rest until it reaches a stead velocity of 30m/s for 6 seconds. It then maintains this velocity for the next 12 seconds before it decelerates to rest for another 2 seconds. Calculate the average speed for the car. **(6marks)**

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15. Given that $5x^3 + \mathbf{p}x^2 + \mathbf{q}x - 12$ is identical to $(5x^2 - 13x - 6)(x + 2)$. Find the value of **p** and **q** (5marks)

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16. In Figure 4, DB is perpendicular to the line AC at point B. AE = 15cm, BC = 25cm angle EAB = 60^0 and angle BCD = 45^0

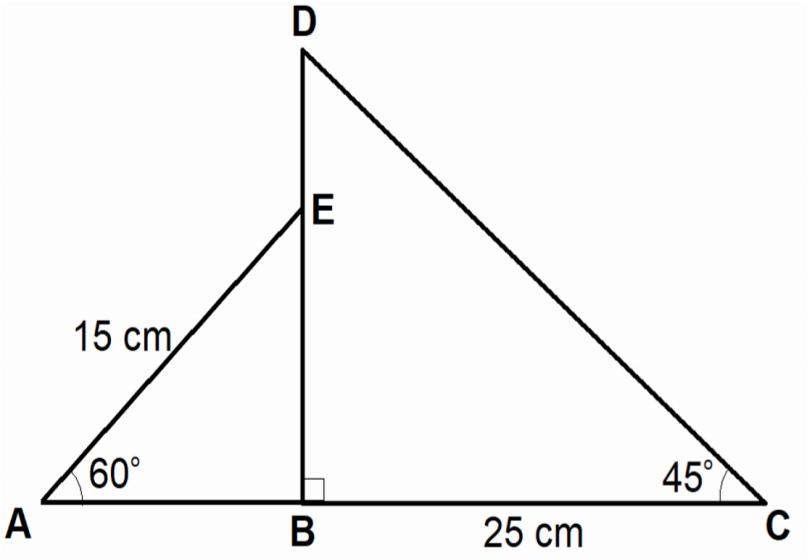

Figure 4

Calculate the length of **DE** leaving your in simplified surd form

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(6 marks)

17. Boat A leaves port P for port Q which is 110km away on a bearing of N69°E. Boat B leaves the same port P on a bearing of N21°W for port R which is 600km away. How far apart are the ports Q and R? (6marks)

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18. Given that triangle ABC has vertices $A\ (1,-1), B\ (3,0)$ and $C\ (4,4)$. Triangle ABC is mapped onto triangle $A'B'C'$ under an anti – clockwise rotation of 90^o about O. Illustrate on a clearly labeled diagram and state the coordinates of A', B' and C' on the graph paper below. **(6 marks)**

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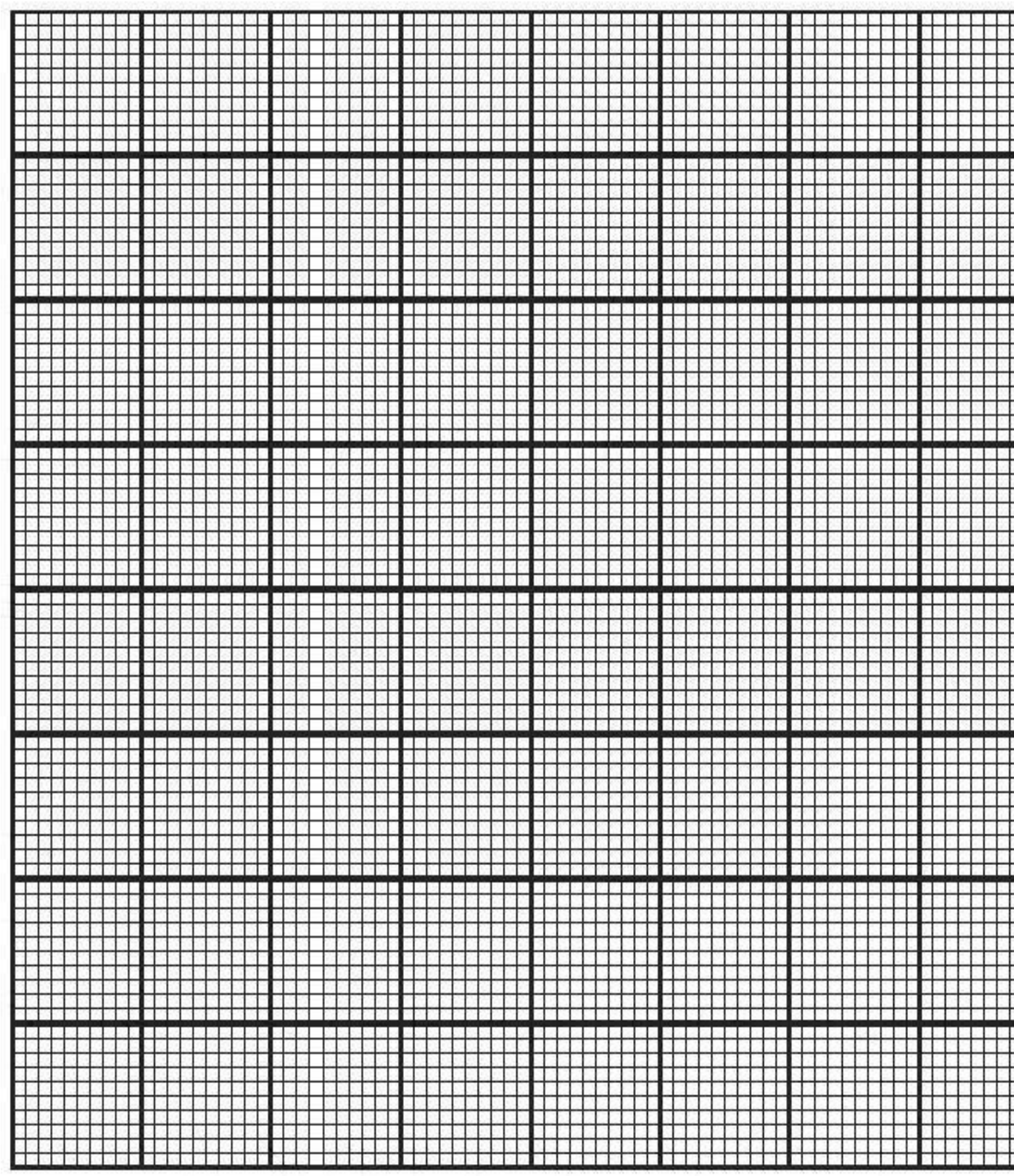

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19. Given that n(A) = 14, n(B) = n and (A ∩ B) = 5. Find n(A ∪ B). **(3marks)**

20. In **figure 5** below X is a midpoint of BA, $\overrightarrow{AB}$ = **b** and OA = **a**.

Figure 5

Find $\overrightarrow{OX}$ interms of **a** and **b**.

END OF QUESTION PAPER