CANDIDATE NAME_____ DAY/OPEN *(Tick)*

CENTRAL EAST EDUCATION DIVISION

2026 MSCE MOCK EXAMINATION

MATHEMATICS

Wednesday, 18 March

Subject Number: M131/I
Time Allowed: 2 hours
08:00 – 10:00 am

PAPER I

(100 Marks)

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 indicated 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. Write your name on top of each page of this paper

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
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CANDIDATE NAME_____ **DAY/OPEN** ***(Tick)***

1. Factorise $6 - 15x + 9x^2$ completely **(4 marks)**

2. Simplify $\left(2 + \sqrt{3}\right)\left(4 - \sqrt{12}\right)$ without using a calculator. **(4 marks)**

3. Points A and B have position vectors $\begin{pmatrix}3\\7\end{pmatrix}$ and $\begin{pmatrix}9\\x\end{pmatrix}$ respectively. Given that $|\overrightarrow{AB}|$=15. Calculate values of x**.** **(6 marks)**

4. From the top of a tower **80m** high two boats are seen in a direction due south. The angles of depression of the boats from the top of the tower are **45°** and **30°**. Find the distance between the two boats and leave the answer in surd form. **(6 marks)**

5. **Figure 1** shows a speed time graph of a journey.

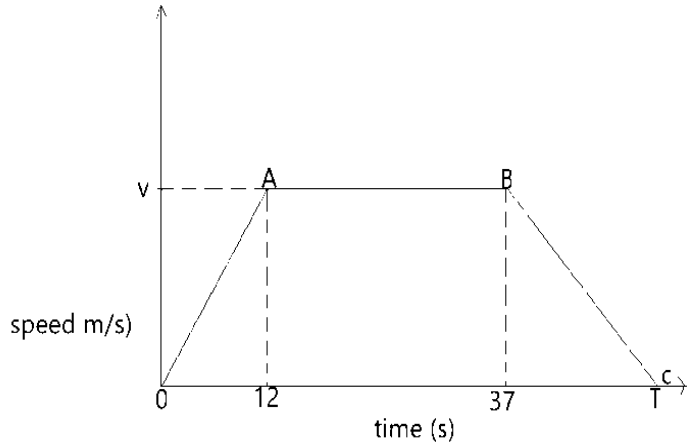


Figure 1

If **868m** is covered in the first 37 seconds, calculate the speed **V m/s.**

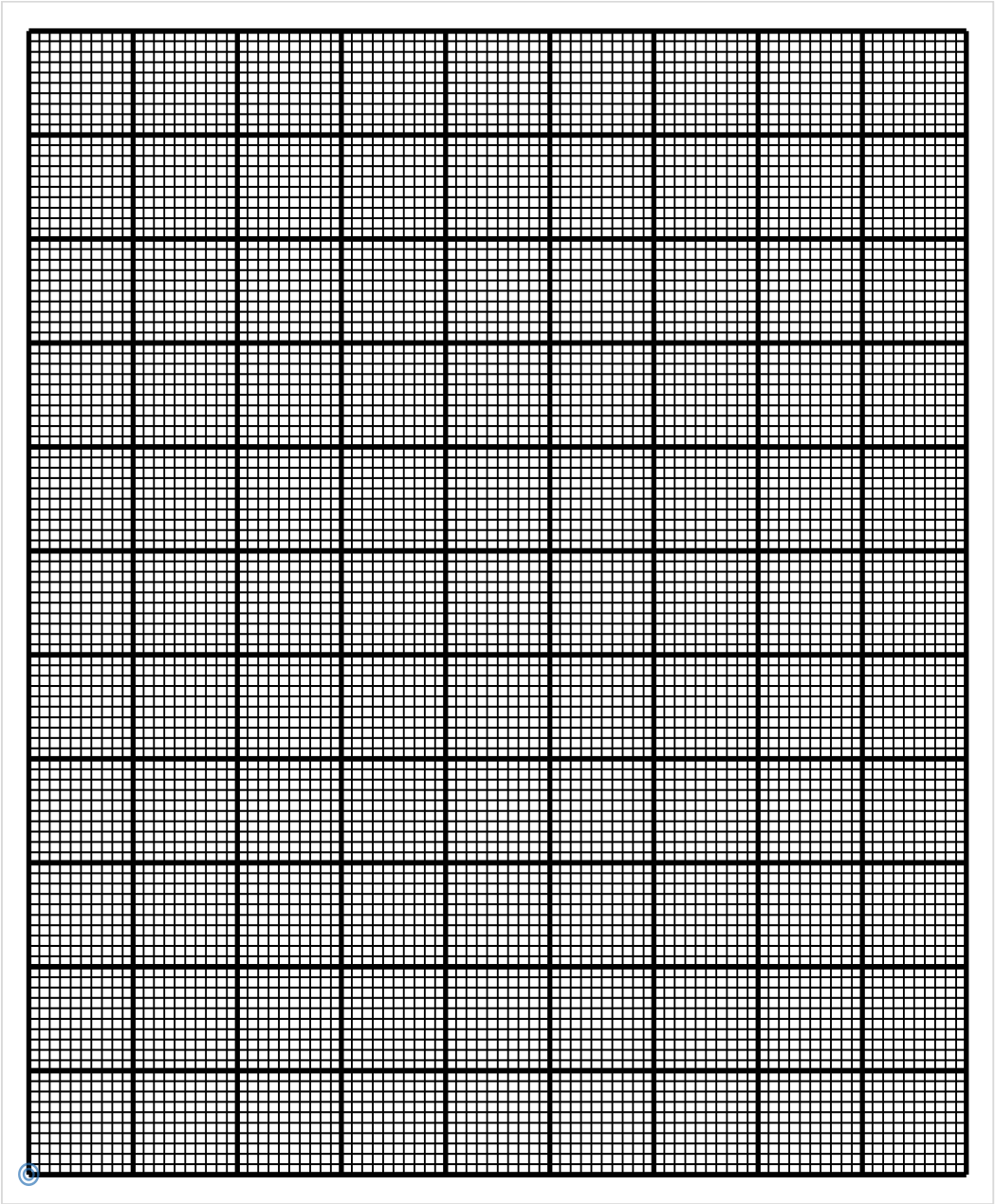
(5 marks)

6. Make **x** subject of the formula $r = \sqrt{\frac{ax-p}{q+bx}}$ **(5 marks)**

7. Solve the equation $5x^2 - 6x - 2 = 0$, leaving your answer correct to 2 decimal places **(6 marks)**

8. The sum of n terms of a geometric progression (G.P), $3, \frac{3}{2}, \frac{3}{4}\ldots$ is $\frac{3069}{512}$. Calculate the number of terms **(5 marks)**

9. Triangle $P(1,6)$, $Q(5,4)$, $R(3,2)$ is mapped onto triangle $P'(-2,-6), Q'(-4,-5), R'(-3,-4)$ by an enlargement E. By drawing the triangles on the graph paper find the coordinates of the centre of enlargement. **(5 marks)**



10. The surface areas of two similar cylinders are $64\ cm^2$ and $121\ cm^2$. Find the volume of the smaller cylinder. **(5 marks)**

11. When a polynomial $t^4 - 5t^2 + \boldsymbol{b}t - 4$ is divided by $t + 2$ the remainder is -4. Calculate the value of **b.** **(5 marks)**

12. Figure 2 shows a circle ABCD centre O. AC cuts BD at E such that angle AED = 90°

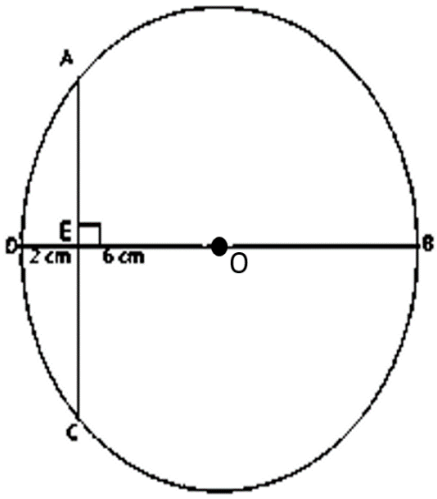


Figure 2

If DE = 2 cm and EO = 6 cm, calculate the length of AC. **(5 marks)**

13. Given that matrices $\boldsymbol{A} = \begin{bmatrix} \mathbf{2} & \mathbf{8} \\ \mathbf{4} & \mathbf{6} \end{bmatrix}$ $\boldsymbol{B} = \begin{bmatrix} \mathbf{1} & \boldsymbol{k} \\ \mathbf{1} & \mathbf{2} \end{bmatrix}$ $\boldsymbol{C} = \begin{bmatrix} \mathbf{5} & \mathbf{7} \\ \mathbf{5} & \mathbf{4} \end{bmatrix}$, calculate the value of k if $\boldsymbol{AB} = \mathbf{2}\boldsymbol{C}$. **(5 marks)**

14. The range of the function $h(x) = \frac{x+1}{2x+3}$ is $\left\{0, \frac{1}{3}, \frac{4}{9}\right\}$. Draw an arrow diagram showing the mapping with its domain. **(6 marks)**

15. **Figure 3** shows circle ABC centre O, angle AXB = 46°, tangents PX and QX touch the circle at A and B respectively.

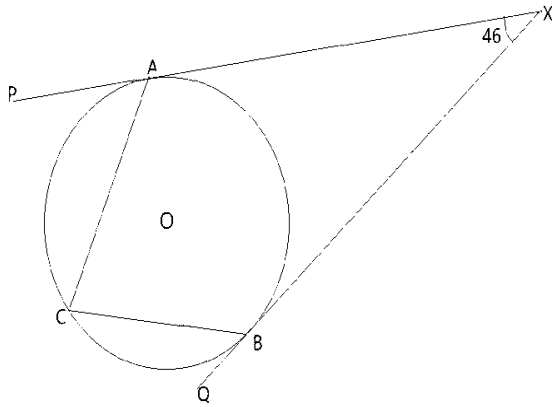


Figure 3

Find angle ACB **(5 marks)**

16. Given that energy (E) varies directly as the resistance (R) and inversely as the square of the distance (D). If energy is $\frac{32}{25}$ when resistance is 8 and distance is 5, calculate the distance when resistance is 4 and energy is $\frac{4}{5}$.

(6 marks)

17. **Figure 4** shows an ice cream, consisting of a hemisphere and a cone with height 10 cm and diameter 5 cm.

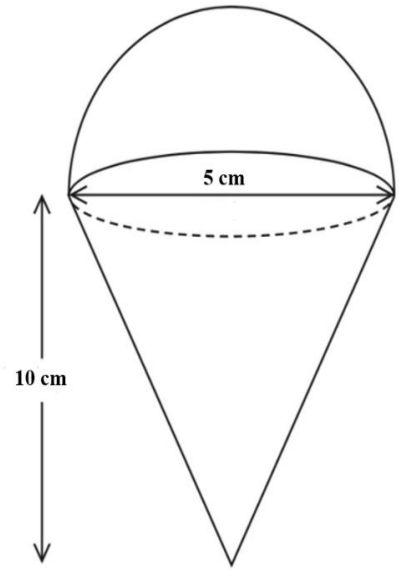
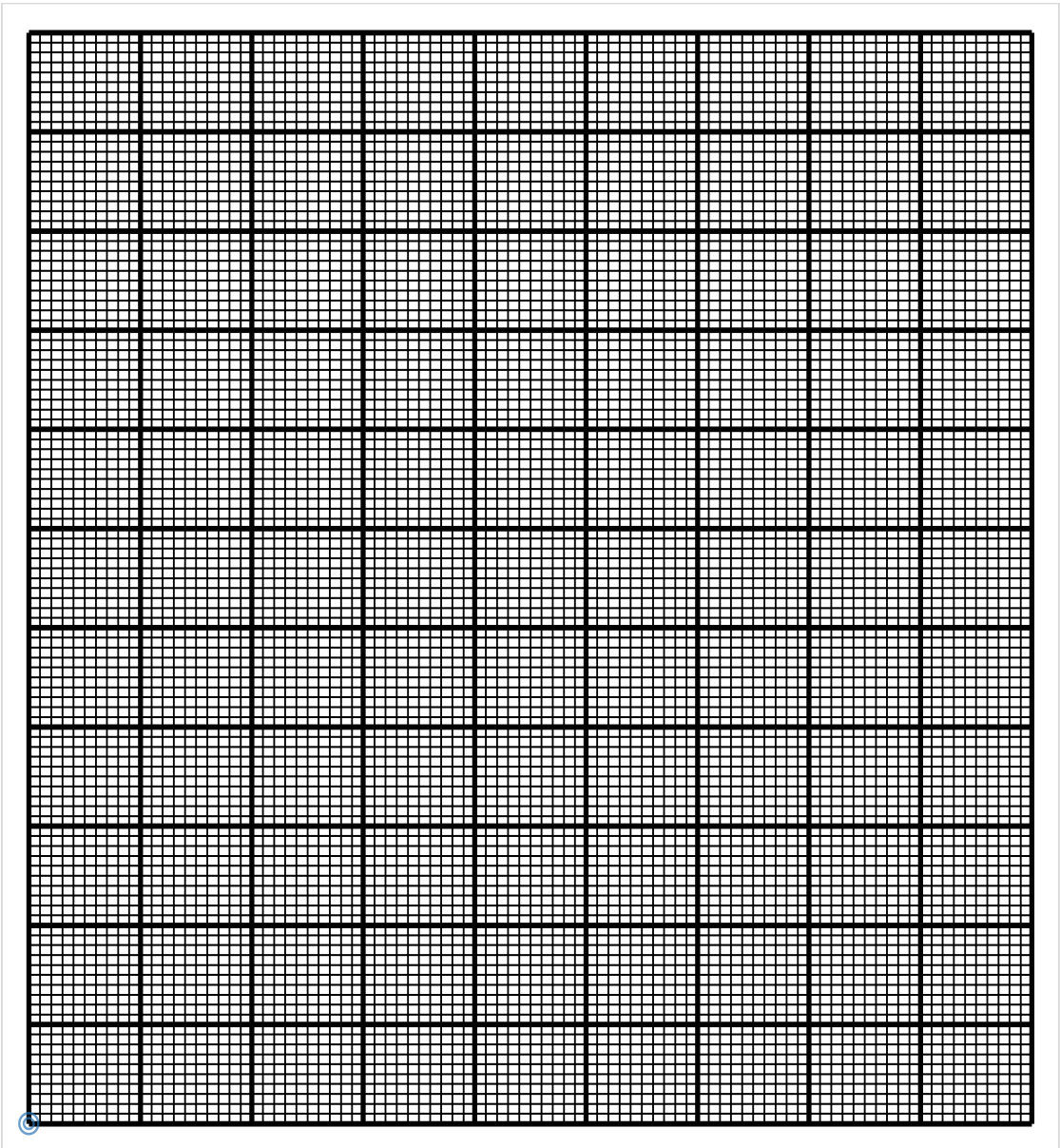


Figure 4

Calculate the total volume of the ice cream, giving your answer correct to two decimal places. **(5 marks)**

18. On the same axes, draw the graphs to show the region bounded by the following inequalities on the graph paper below. Shade the unwanted region. **(5 marks)**

$$2x + 3y < 6$$
$$y - 2x \leq 2$$
$$y \geq 0$$
$$x \geq 0$$



19. Find the y-intercept of the line through the point (3,2) and parallel to the line of $3y - 4x = 5$. **(4 marks)**

20. Table below shows marks scored by two students: Mary and John. Mary sat for 5 subjects while John sat for 4 subjects. John has x marks missing.

Mary	67	82	42	77	92
John	87	80	x	73	

Given that the mean marks of the two students are the same, calculate the value of x. **(3 marks)**

END OF QUESTION PAPER

NB: This paper contains 16 Printed pages.