NAME:_____ SCHOOL:_____

2024 M131/I

NSANJE DISTRICT MOCK

MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

MATHEMATICS

Subject Number: M131/I

Wednesday, 20 March

Time Allowed: 2 hours

8:00-10:00 am

PAPER I

(100 marks)

Instructions

1. **This paper contains 12 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. Write your answers in the spaces provided on the question paper.
5. Calculators may be used.
6. **All working must be clearly shown.**
7. Write your **Name and School name** 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.

Question Number	Tick if answered	Do not write in these columns	
1			
2			
3			
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	Total		

1. Factorise completely $3x^2 + 5xy - 2y^2$ **(4 marks)**

1. Without using a calculator, simplify $2\sqrt{12} - 3\sqrt{27} + 4\sqrt{75}$. **(4 marks)**

3. **P** varies directly as **Q** and inversely as **R**. When **P** = 25, **Q** = 5 and **R** =3.Find **P** when **Q** = 20 and **R** = 15. **(6 marks)**

Continued/...

4. Given that the function $f(x) = \frac{1-7x}{3}$ is defined on the domain $\{a, 5\}$ and the range $\{4, n\}$. Find the values of a and n and represent the function on an arrow diagram. **(5 marks)**

5. Find the surface area of a closed cone whose height is 5 cm and radius 12 cm. $\pi = 3.14$. **(3 marks)**

Continued/...

2. Make *y* the subject of the formula $\frac{K}{c} = \sqrt[3]{\frac{y}{y-2}}$. (6 marks)

7. In **Figure 1 MTP** is a tangent to a circle **TXYZ**.

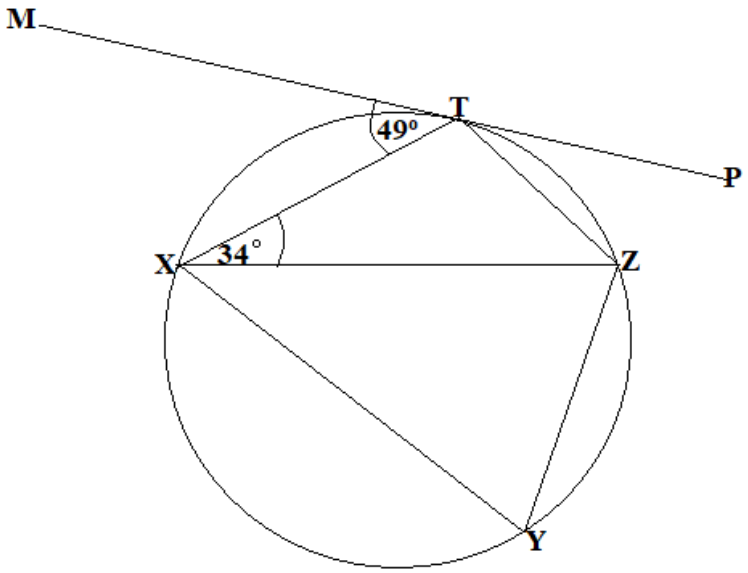

Figure 1

If angle **MTX** = 49^0 and angle **TXZ** = 34^0, calculate angle **XYZ**. **(6 marks)**

8. A straight line has point **A** (a, 3) and point **B** (4, b). If the midpoint of **AB** = (3, 5), find the values of a and b**.** **(4 marks)**

9. Given that $V = \begin{pmatrix} 2 & 4 \\ 3 & 3 \end{pmatrix}$ and $W = \begin{pmatrix} 0 & -2 \\ 6 & 4 \end{pmatrix}$, find $\frac{1}{2}$W(V+*W*). **(5 marks)**

Continued/...

10. Given that -4, -2, -1, 2, 5 are the deviations from the mean in mathematics exercise for 5 students in form 4. Calculate the standard deviation. **(6 marks)**

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11. **Figure 2** shows a speed-time graph of a moving object.

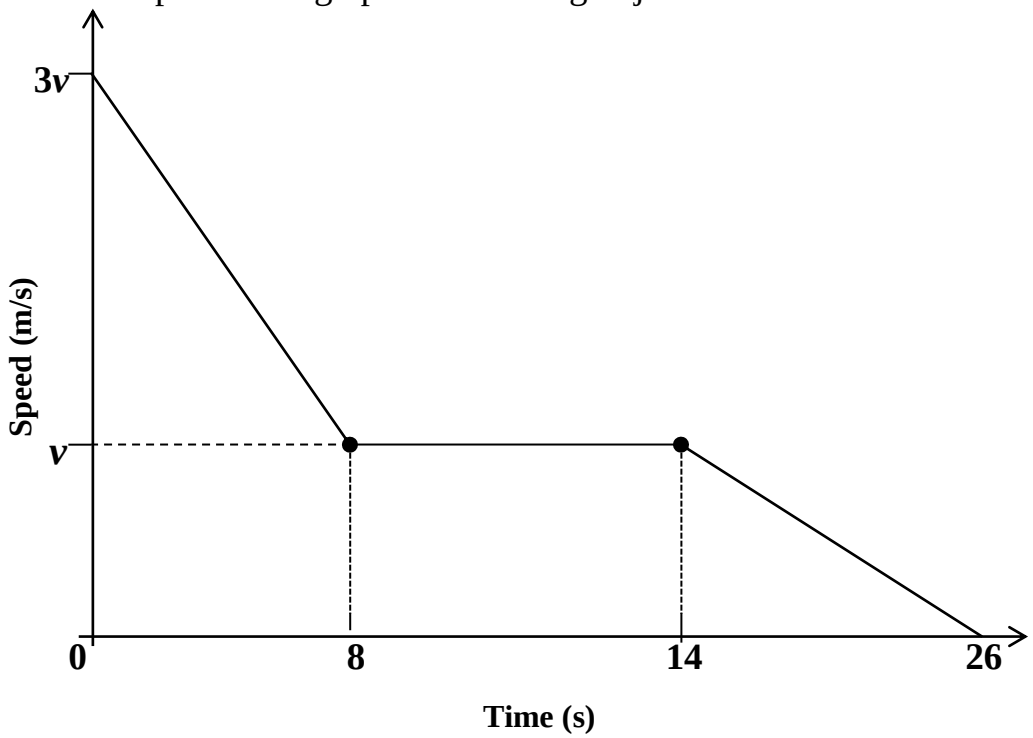


Figure 1

Given that the total distance covered by the object is 840 m, calculate the deceleration of the object in the last 12 seconds. **(6 marks)**

12. The sum of the first 8 terms of a geometric progression is 1020. Given that the common ratio is 2, calculate the first term of the geometric progression. **(4 marks)**

13. **Figure 3** is a triangle **XYZ.**

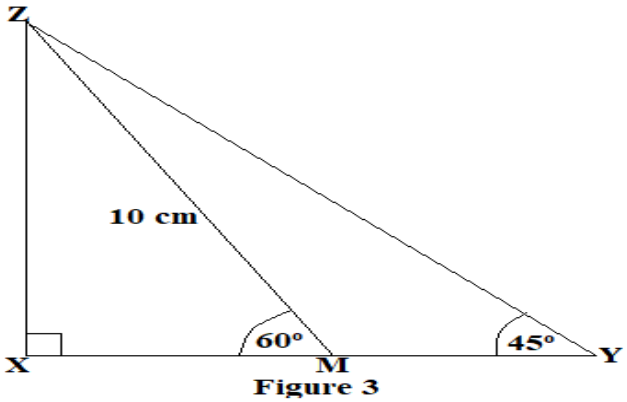


Figure 3

Calculate the length of **YM** in surd form**.** **(6 marks)**

14. **Figure 4** is a circle **ABCD** in which **EBP** is a tangent at **B** and **DCP** is a straight line.

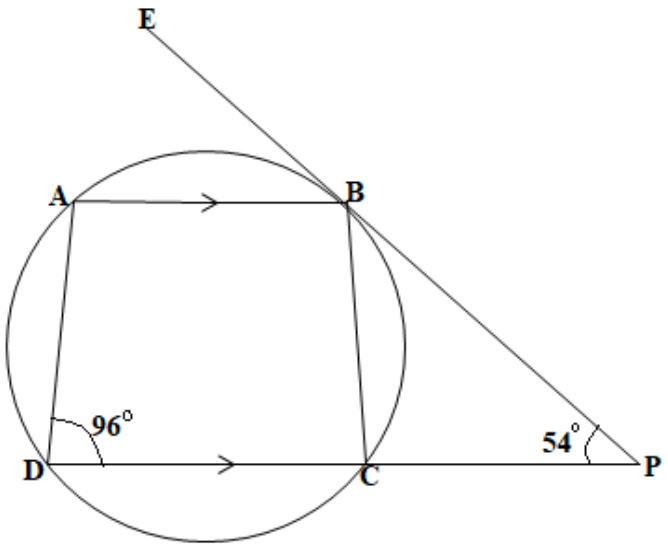


Figure 4

If angle **BPC**=54° and angle **ADC**= 96°, calculate angle **CBP**. **(5 marks)**

15. A metallic sphere of radius 6 cm is melted down to form a cylindrical bar of diameter 6 cm. Calculate the length of the cylindrical bar. (Take $\pi = 3.14$).

(5 marks)

Continued/...

16. Given that the region **R** is bounded by the following inequalities..

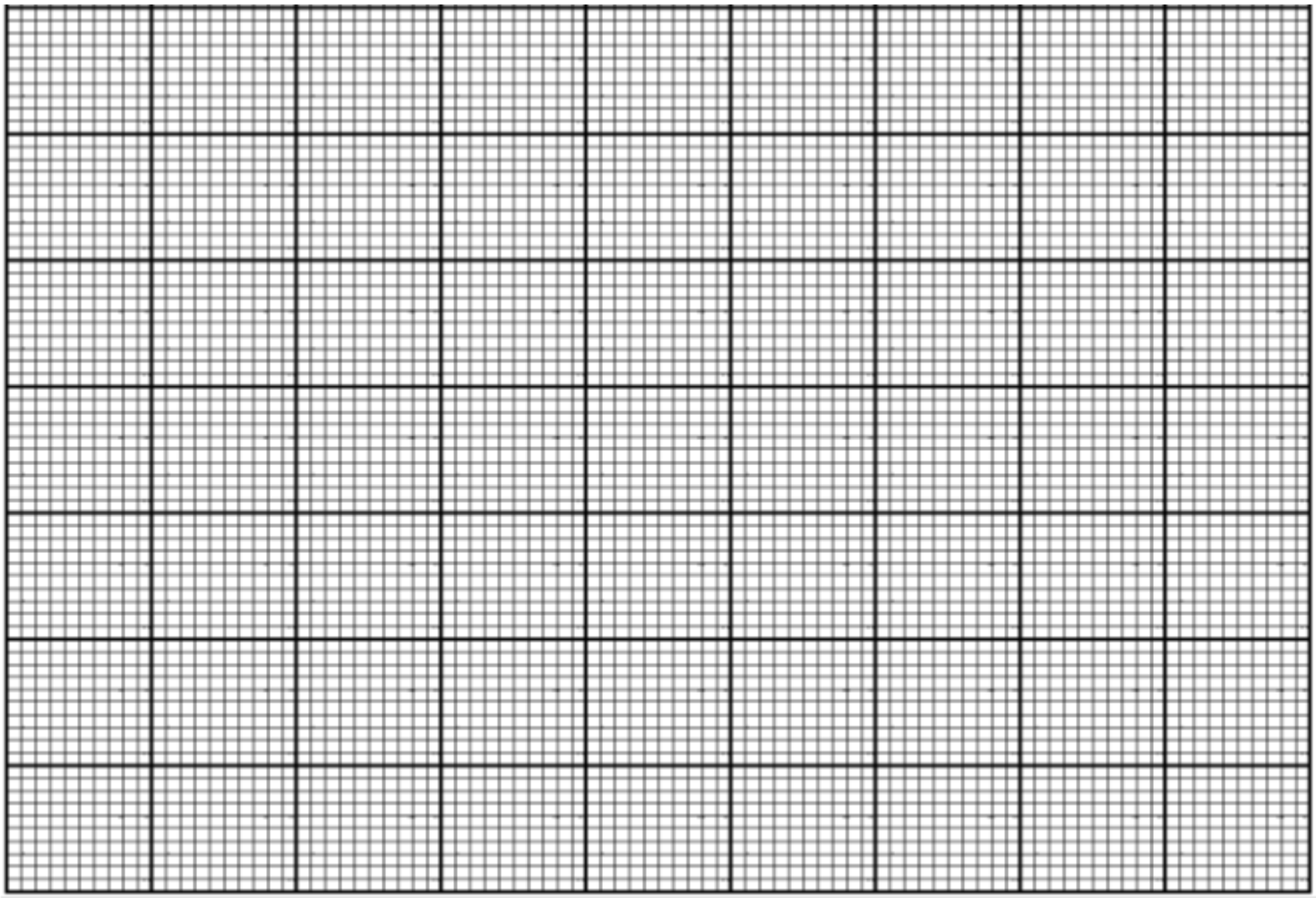
$x \geq 4$

$y \geq -1$

$y + x < 10$

$2x + y \leq 10$

Using a scale of 2 cm to represent 2 units on both axes, show the region **R** represented by the **four** inequalities by shading the unwanted region. **(6 marks)**



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17. The probability that Mary passes examinations is $\frac{4}{5}$. If she passes, the probability that she does not get a job is $\frac{3}{8}$. If she does not pass, the probability that she gets a job is $\frac{1}{4}$. Use a tree diagram to find the probability that Mary gets a job. **(6 marks)**

18. Given that $\underline{p} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ and $\underline{q} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$, find the values of **m** and **n** such that

m $\underline{p}$ + **n**$\underline{q}$ $= \begin{pmatrix} 15 \\ 24 \end{pmatrix}$. **(5 marks)**

Continued/...

19. Two similar triangles have corresponding sides 2 cm and 5 cm. If the area of a larger triangle is 150 cm^2, calculate the area of the smaller triangle. **(4 marks)**

20. **Figure 5** is a triangle **DEF** in which **DE**= 10 cm and **FE**= 15 cm.

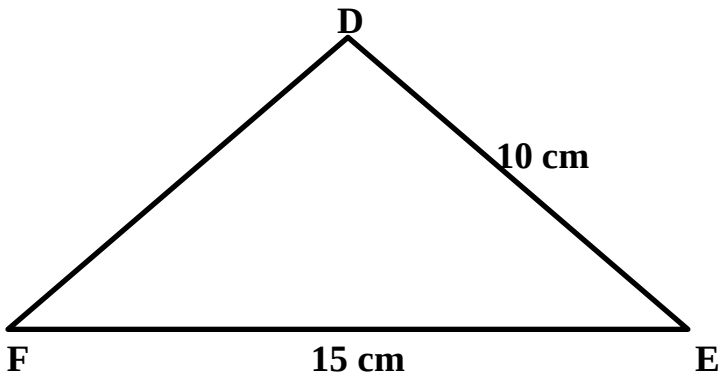

Figure 5

Given that the area of the triangle **DEF** is 36 cm^2, calculate angle **DEF** to the nearest degree. **(5 marks)**

END OF QUESTIONPAPER

NB: This paper contains 12 pages.