CANDIDATE NAME: _____

NORTHERN EDUCATION DIVISION

2026 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATION

MATHEMATICS -MARKING KEY

Subject Number: M131/I

Wednesday, 23 March

Time Allowed: 2 hours

8:00 – 10:00 am

PAPER I

(100 marks)

Instructions

1. **This paper contains 13 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. The graph paper and blank answer sheet at the end of the question paper can be used if required. Do **not** tear them off.
7. **All working must be clearly shown.**
8. Write your **Name** at the top of every page

Question Number	Tick if answered	Do not write in these columns	
1			
2			
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20						

 Turn over

1. Factorize completely: $2xy^2 - \frac{8x}{9}$.

$2x\left[y^2 - \frac{4}{9}\right]$ M1

$2x\left[(y)^2 - \left(\frac{2}{3}\right)^2\right]$ M1

$\mathbf{2}x\left(y - \frac{2}{3}\right)\left(y + \frac{2}{3}\right)$ **M1 A1**

2. Simplify $\frac{3\sqrt{8}}{\sqrt{80} - \sqrt{5}}$, giving the answer with a rational denominator.

$\frac{3\sqrt{4 \times 2}}{\sqrt{16 \times 5} - \sqrt{5}}$ **M1**

$\frac{6\sqrt{2}}{4\sqrt{5} - \sqrt{5}}$ M1

$\frac{6\sqrt{2}}{3\sqrt{5}}$

$\frac{2\sqrt{2}}{\sqrt{5}}$ M1

$\frac{2\sqrt{2}}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}}$ M1

$\frac{2\sqrt{10}}{5}$ **A1**

3. The function $f(x)=¿\ \frac{1-2x}{x}$ is defined on the range $\{-1,-3,\}$. Draw an arrow diagram to represent this function.

$$\frac{1-2x}{x}=-1 \quad \text{M1}$$

$$1-2x=-x$$

$$1=-x+2x$$

$$x=1 \quad \text{M1}$$

$$\frac{1-2x}{x}=-3 \quad \text{M1}$$

$$1-2x=-3x$$

$$1=-3x+2x$$

$$1=-x$$

$$x=-1 \quad \text{M1}$$

$$\begin{pmatrix}1\\-1\end{pmatrix} \longrightarrow \begin{pmatrix}-1\\-3\end{pmatrix} \quad \text{A1}$$

Domain Range

4. Make q subject of the formula: $f=¿\left(\frac{p}{\sqrt{q}-d\sqrt{q}}\right)^2$.

$f=¿\left(\frac{p}{\sqrt{q-d\sqrt{q}}}\right)^2$

$f=¿\left(\frac{p}{\sqrt{q(1-d)}}\right)^2$ M1

$f=¿\frac{p^2}{q(1-d)^2}$ M1

$fq(1-d)^2=p^2$ M1

$q=¿\frac{p^2}{f(1-d)^2}$ **A1**

5. Point A (2, -5) is mapped onto A' (-9, 7) under translation. Find the image of B (-1, 7) under the same translation.

A+T=A'

$\begin{pmatrix}2\\-5\end{pmatrix}+T=\begin{pmatrix}-9\\7\end{pmatrix}$ M1

$T=\begin{pmatrix}-9\\7\end{pmatrix}-\begin{pmatrix}2\\-5\end{pmatrix}$

$T=\begin{pmatrix}-11\\12\end{pmatrix}$ M1

B'=B+T

$=\begin{pmatrix}-1\\7\end{pmatrix}+\begin{pmatrix}-11\\12\end{pmatrix}$ M1

$=\begin{pmatrix}-12\\19\end{pmatrix}$ A1

6. Given that $\begin{pmatrix}2 & p & 3\end{pmatrix}\begin{pmatrix}3\\1-p\\7\end{pmatrix}=\begin{pmatrix}25\end{pmatrix}$, find the values p.

$$\begin{pmatrix}2 & p & 3\end{pmatrix}\begin{pmatrix}3\\1-p\\7\end{pmatrix}=\begin{pmatrix}25\end{pmatrix}$$

$(2\times3)+p(1-p)+(3\times7)=25$ M1

$6+p-p^2+21=25$ M1

$p^2-p-2=0$ M1

$(p-2)(p+1)=0$ M1

$p=2, p=-1$ **A1**

7. Solve the equation $5x^2-x-2=0$, giving the answer correct to 2 decimal places.

$a=5, b=-1, c=-2$ M1

$x=¿\ \dfrac{-(-1)\pm\sqrt{(-1)^2-4(5)(-2)}}{2(5)}$ M1

$x=\dfrac{1\pm\sqrt{1+40}}{10}$ M1

$x=\dfrac{1+\sqrt{41}}{10}$ or $x=\dfrac{1-\sqrt{41}}{10}$ M1

$x=0.74031242\vee-0.5403124$ M1

$x=0.74\vee-0.54$ A1

8. Points A and C are given by (7, 2) and $(-1,6)$ respectively. Given that $\overrightarrow{AB}\frac{1}{3}\overrightarrow{BC}$, find the coordinates of B.

$3\overrightarrow{AB}=\overrightarrow{BC}$ M1

$3[B-A]=C-B$ M1

$3\left[B-\begin{pmatrix}7\\2\end{pmatrix}\right]=\begin{pmatrix}-1\\6\end{pmatrix}-B$ M1

$3B-\begin{pmatrix}21\\6\end{pmatrix}=\begin{pmatrix}-1\\6\end{pmatrix}-B$ M1

$3B+B=¿\begin{pmatrix}-1\\6\end{pmatrix}+\begin{pmatrix}21\\6\end{pmatrix}$ M1

$4B=¿\begin{pmatrix}20\\12\end{pmatrix}$

$B=¿\begin{pmatrix}5\\3\end{pmatrix}$

$B=(5,3)$ **A1**

9. Given that the lines $-5x=8-4y-ax$ and $10y-5x=0$ are parallel, find the value of a.

$4y=5x-ax+8$ M1

$4y=(5-a)x+8$

$y=¿\frac{(5-a)x}{4}+2$

$m_1=¿\frac{5-a}{4}$ M1

$10y=5x$

$m_2=1/2$ M1

$m_1=m_2$ (gradients of parallel lines)

$\frac{5-a}{4}=\frac{1}{2}$ M1

$10-2a=4$

$2a=6$

$a=3$ **A1**

10. Given that $(4x+Q)^2 \equiv Ax^2+24x+5+K$, find the values of A, Q and K.

$16x^2+8Qx+Q^2=Ax^2+24x+5+k$ M1

$16x^2=Ax^2$ M1

$A=16$ **A1**

$8Qx=24x$

$8Q=24$

$Q=3$ **A1**

$Q^2=5+k$

$3^2=5+k$

$9=5+k$

$k=4$ **A1**

11. **Figure 1** below shows a graph of a moving object.

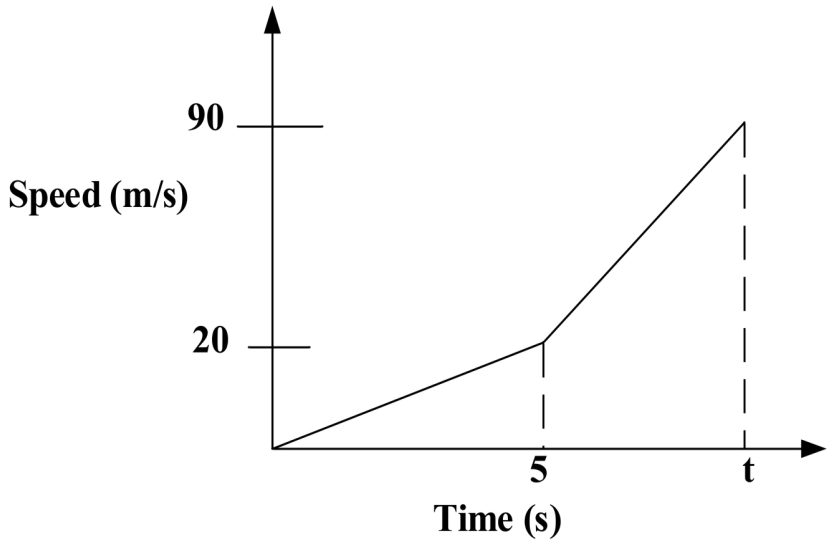


Figure 1

Given that the average speed during t seconds is 40 m/s, find the value t.

$$Av = \frac{total\ distance}{total\ time}$$

$$\begin{aligned} d &= \frac{1}{2}\times 5\times 20+\frac{1}{2}(20+90)(t-5) \quad \text{M1} \\ &= 50+55(t-5) \\ &= 50+55t-225 \quad \text{M1} \\ &= 55t-225 \end{aligned}$$

$Av = \frac{55t-225}{t} = 40$ M1

$\frac{55t-225}{t} = 40$

$55t-225=40t$ M1

$15t=225$

$t=15\,s$ **A1**

12. The ratio of volume and area of two similar figures are 8:27 and $(x+2):(2x+7)$ respectively. calculate the value of x.

$\left(\frac{x}{y}\right)^3=\frac{8}{27}$ M1

$\frac{x}{y}=\sqrt[3]{\frac{8}{27}}$

$\frac{x}{y}=\frac{2}{3}$ (sf) M1

$\left(\frac{2}{3}\right)^2=\frac{x+2}{2x+7}$ M1

$\frac{4}{9}=\frac{x+2}{2x+7}$

$8x+28=9x+18$ M1

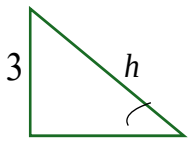
$-x=-10$

$x=10$ **A1**

13. Given that $tan\theta = 0.75$, find $cos\theta+sin\theta$.

$tan\theta = \frac{75}{100}$ M1

$tan\theta = \frac{3}{4}$



$h^2=3^2+4^2$ M1

$h^2=25$

$h=5$ M1

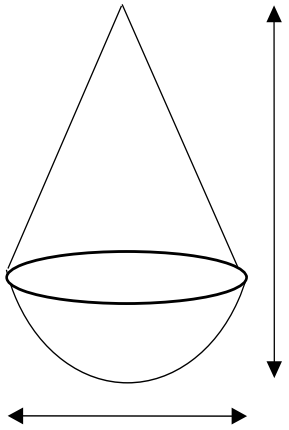
$sin\theta = ¿ \frac{3}{5}, cos\theta = ¿ \frac{4}{5}$ M1

$sin\theta + cos\theta = ¿ \frac{3}{5} + \frac{4}{5}$

$= \frac{7}{5}$

$= \mathbf{1.4}$ **A1**

14. **Figure 2** shows a bulb of height 7 cm and base diameter 6cm.



7cm

6 cm

Figure 2

Calculate the surface area of the bulb, giving the answer to 2 decimals places. Take $\pi = ¿ \frac{22}{7}$.

$l^2 = 4^2 + 3^2$ M1

$l^2 = 25$

$l = 5$ cm A1

$Area = ¿ \pi r^2 + \frac{2}{3}\pi r^2$

$¿ \frac{27}{7} \times 3 \times 5 + \frac{2}{3} \times \frac{22}{7} \times 27$ M1

$= 47.143 + 56.571$

$= 103.714$ M1

$= \mathbf{103.71\ cm^2}$ **A1**

15. In a G.P with 10 terms, the seventh term is eight times the fourth term. If the last term is 1536. Calculate the sum of the first four terms.

$ar^6 = 8ar^3$ M1

$r^8 = 8$

$r = 2$ M1

$a(2)^{10-1} = 1536$

$a(2)^9 = 1536$

$512a = 1536$ M1

$a = 3$

$S_4 = ¿ \frac{3(2^4 - 1)}{2 - 1}$ M1

$= 3 \times 15$

$= \mathbf{45}$ **A1**

16. Given that p is inversely proportion to the square of q and cube root of r. When $p = 5, q = -2$ and $r = 27$, find r when $p = 24$ and $q = \frac{1}{2}$.

$p = ¿ \frac{k}{q^2 \sqrt[3]{r}}$ M1

$5 = ¿ \frac{k}{(-2)^2 \sqrt[3]{27}}$

$5 = ¿ \frac{k}{24}$

$k=120$ M1

Relationship

$p=¿\frac{120}{q^2\sqrt[3]{r}}$ M1

$24=¿\frac{120}{(0.5)^2\sqrt[3]{r}}$

$6\sqrt[3]{r}=120$ M1

$\sqrt[3]{r}=20$

$r=20^2$

$r=8000$ **A1**

17. The scores: $(x-2), 4, (x+2), (2x+1), 9$, are arranged in ascending order. If the median is equal to the mean, find the value of x.

$x+2=¿\frac{x-2+4+x+2+2x+1+9}{5}$ M1

$5x+10=4x+14$ M1

$5x-4x=14-10$ M1

$x=10$ **A1**

18. Chords of a circle AB and DC are 5 cm and 3 cm away from the centre respectively. If AB is 24 cm long, calculate the length of chord DC.

$r^2=12^2+5^2$ M1

$= 144+25$

$= 169$

$=\sqrt{169}$

$r=13$ (radius) M1

$13^2=3^2+y^2$ M1

$169=9+y^2$

$y^2=160$

$y = \sqrt{160}$

$y = 4\sqrt{10}$ M1

$DC = 2 \times 4\sqrt{10}$ M1

$= 8\sqrt{10}$ cm A1

19. **Figure 3** shows a circle PQRS centre O, PQ=QR and angle PSR = 82^0.

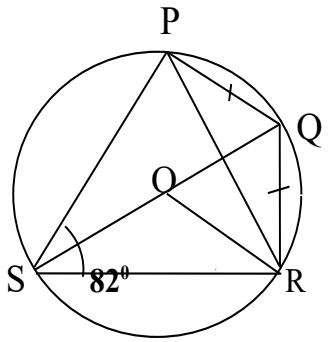


Figure 3

Calculate angle ORS.

¿PQR+82^0=180^0 (opp ¿s of cyclic quad) M1

¿PQR=180^0-82^0

$= 98^0$ M1

¿QPR= $\frac{180^0 - 98^0}{2}$ (base <s of isos Δ) M1

¿QPR=41^0 M1

But: <SPR=90^0-41^0 (<s in a semi-circle)

$= 49^0$ M1

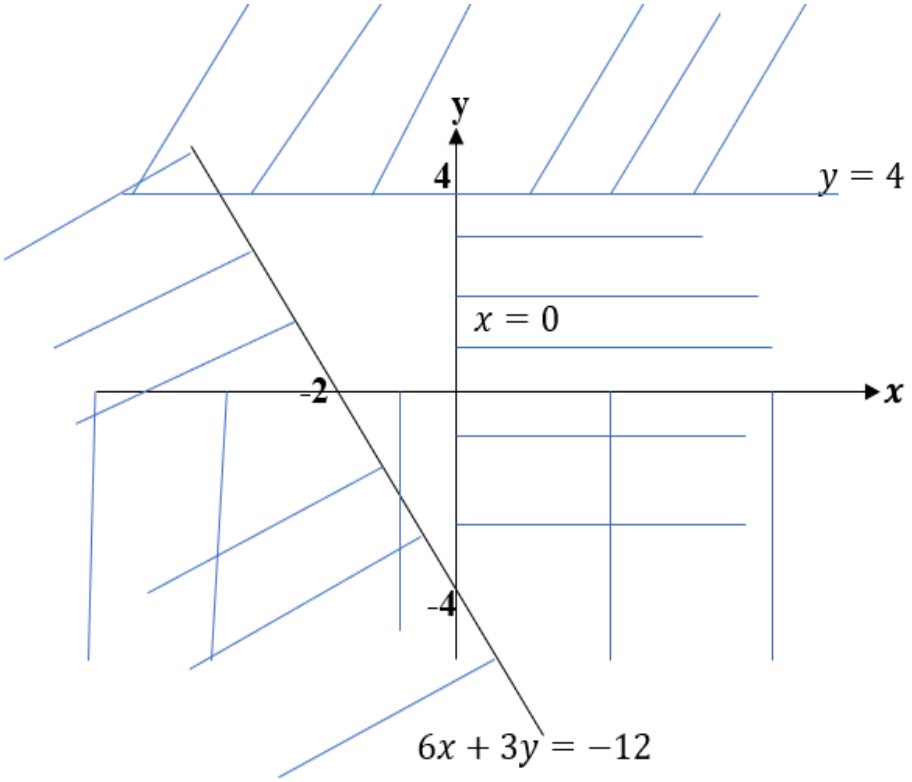
<SQR= 2× 49^0 = 139^0 (< at the centre) A1

20. On the same axes, draw the graphs of the following inequalities by shading the unwanted regions: $6x+3y\geq -12,\ y\geq 4, x\leq 0, y\geq 0.$

$6x+3y=-12$

x	0	-2
y	-4	0

M1



M1M1 Drawing the graphs
M1 Shading
M1 Scale

END OF MARKING KEY

NB: This paper contains 13 printed pages.