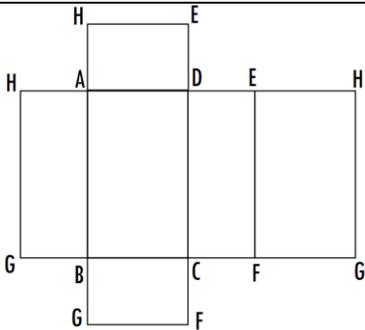


FORM 4 MATHEMATICS MID TERM 1 2026 MARKING SCHEME

No.	Working	Marks	Comments
1.	$\frac{3}{5} \text{ of }^{-6} + 2 \frac{2}{3} \times 1 \frac{1}{2} = n^{-n}$ $1 \frac{1}{8} - \frac{5}{2} + 1 \frac{4}{5} \div \frac{9}{10}$ $\frac{-\frac{18}{5} + \frac{20}{5}}{\frac{25}{8} - \frac{20}{8}}$ $\frac{2}{5} \times \frac{5}{8} = \frac{1}{4}$ $\left(\frac{1}{2}\right)^2 = 2^{-2}$ $\therefore n = 2$	<p style="text-align: center;">M1</p> <p style="text-align: center;">A1</p> <p style="text-align: center;">B1</p>	<p>Numerator and denominator correctly simplified</p> <p>Accuracy</p> <p>Value of n</p>
		03	
2.	$(0.04321)^{\frac{1}{2}} + \left(\frac{3}{4.321}\right)^2$ $(4.321 \times 10^{-2})^{\frac{1}{2}} + (3 \times \text{rep. of } 4.321)^2$ $2.0787 \times 10^{-1} + (3 \times 0.2314)^2$ $0.20787 + (0.6942)^2$ $0.20787 + (6.942 \times 10^{-1})^2$ $0.20787 + 48.19 \times 10^{-2}$ 0.68977	<p style="text-align: center;">M1</p> <p style="text-align: center;">M1</p> <p style="text-align: center;">A1</p>	<p>Square root of 0.04321 and reciprocal of 4.321</p> <p>Square of 0.6942</p> <p>accuracy</p>
		03	
3.	<p>$A(3,4)$ and $B(1,-4)$</p> <p>mid - point(2,0)</p> $\text{gradient}_1 = \frac{4 - -4}{3 - 1} = 4$ $\text{gradient}_2 = -\frac{1}{4}$ $\frac{y - 0}{x - 2} = -\frac{1}{4}$ $4y = -x + 2$ $y = -\frac{1}{4}x + \frac{1}{2}$	<p style="text-align: center;">B1</p> <p style="text-align: center;">M1</p> <p style="text-align: center;">A1</p>	<p>Mid-point and gradient</p> <p>Finding equation</p> <p>accuracy</p>
		03	

No.	Working	Marks	Comments
4.	$32^{x^2} = 16^{1\frac{3}{4}x+3}$ $2^{5x^2} = 2^{4(1\frac{3}{4}x+3)}$ $\Rightarrow 5x^2 = 7x + 12$ $5x^2 - 7x - 12 = 0$ $5x^2 - 12x + 5x - 12 = 0$ $x(5x - 12) + 1(5x - 12) = 0$ $(x + 1)(5x - 12) = 0$ $x = -1$ or $x = 2.4$	M1 M1 M1 A1	Same bases on both sides Quadratic equation formed Attempt to solve the quadratic equation accuracy
		04	
5.	$3x - 4 \geq 8x + 1 > 2x - 13$ $3x - 8x \geq 5$ and $8x + 1 > 2x - 13$ $-5x \geq 5$; $6x > -12$ $x \leq -1$; $x > -2$ $\therefore -2 < x \leq -1$ integral values = -1	M1 A1 B1	Attempt to solve separated inequalities Correct combined inequality Integral values stated
		03	
6.	$\log_3(5x + 23) - \log_2 8 = \log_3(9 - x)$ $\log_3(5x + 23) - 3 \log_2 2 = \log_3(9 - x)$ $\log_3\left(\frac{5x + 23}{9 - x}\right) = 3$ $\left(\frac{5x + 23}{9 - x}\right) = 27$ $5x + 23 = 243 - 27x$ $32x = 220$ $x = 6.875$	M1 M1 A1	Collecting log with same bases on one side Dropping of logs on both sides accuracy
		03	
7.	$time = 10.00a.m + \left(\frac{90 - (20 \times 1)}{20 + 8}\right)$ $10.00a.m + 2.5hrs$ $12.30p.m.$ b) $(20 \times 3.5) = 70km$	M1 A1 B1	
		03	

No.	Working	Marks	Comments
8.	$\underline{p} = 2\underline{a} + 3\underline{b} - \underline{c}$ $\underline{p} = 2\begin{pmatrix} -3 \\ 4 \end{pmatrix} + 3\begin{pmatrix} 2 \\ -1 \end{pmatrix} - \begin{pmatrix} -5 \\ -6 \end{pmatrix}$ $\underline{p} = \begin{pmatrix} -6 \\ 8 \end{pmatrix} + \begin{pmatrix} 6 \\ -3 \end{pmatrix} + \begin{pmatrix} 5 \\ 6 \end{pmatrix} = \begin{pmatrix} 5 \\ 11 \end{pmatrix}$ $ \underline{p} = \sqrt{5^2 + 11^2}$ $ \underline{p} = 12.08 \text{ units}$	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Finding vector p</p> <p>Finding modulus of vector p accuracy</p>
		03	
9.	$\text{area} = \sqrt{35(35-27)(35-23)(35-20)} + \frac{1}{2} \times 20 \times 28 \sin 25$ $= 79.42 + 118.33$ 197.75 cm^2	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Finding area using Hero's formula and using $\frac{1}{2} ab \sin \theta$</p> <p>accuracy</p>
		03	
10.	$\bar{X} = \frac{1+6+9m+8+20+12m}{5m+10} = 3.85$ $21m+35 = 19.25m+38.5$ $1.75m = 3.5$ $m = 2$	<p>B1</p> <p>M1</p> <p>A1</p>	<p>Sum of f found</p> <p>Equation formed accuracy</p>
		03	
11.	$\frac{4x^2 - y^2}{3y^2 - 7xy + 2x^2}$ $\frac{(2x-y)(2x+y)}{3y^2 - xy - 6xy + 2x^2}$ $\frac{(2x-y)(2x+y)}{(y-2x)(3y-x)}$ $\frac{(2x-y)(2x+y)}{-1(2x-y)(3y-x)}$ $\frac{(2x+y)}{(x-3y)}$	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Numerator factorized</p> <p>Denominator factorized</p> <p>Accuracy</p>
		03	
12.	$\text{Ksh}(2000 \times 133.98) - 251020 = 16940$ $\text{Dollars } \frac{16940}{110.50}$ $= 153.30 \text{ Dollars}$	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Finding amount in Ksh</p> <p>Finding amount in Dollars Accuracy</p>
		03	
No.	Working	Marks	Comments

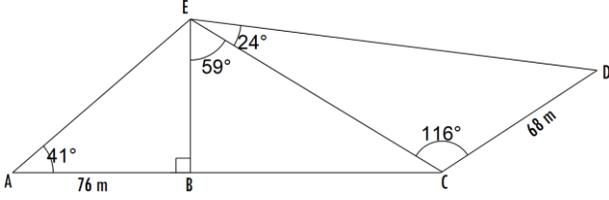
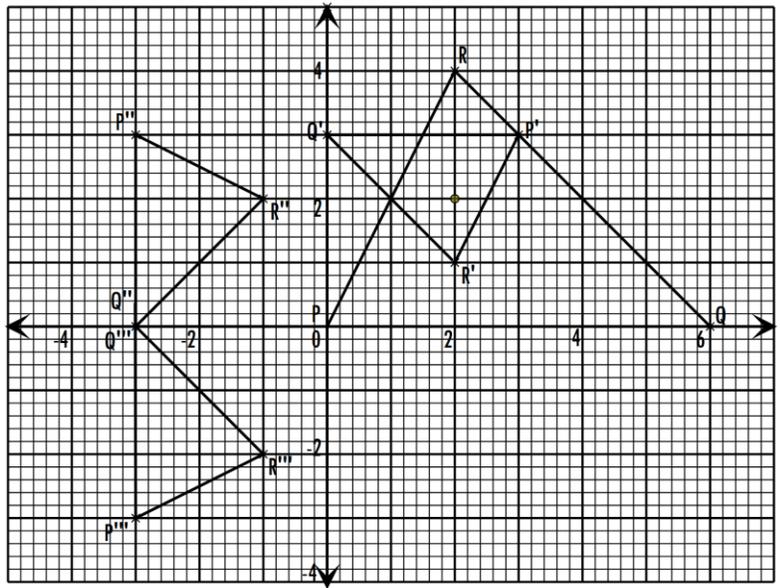
13.	$\text{shaded area} = 2(\text{area of sector} - \text{area of triangle})$ $= 2\left(\frac{1}{4} \times \frac{22}{7} \times 36^2 - \frac{1}{2} \times 36 \times 36\right)$ $= 2(1018.2857 - 648)$ $= 2 \times 370.2857$ $= 740.5714 \text{ cm}^2$	<p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>Expression for area of sector</p> <p>Expression for area of triangle Subtracting the two and multiplying by 2</p> <p>accuracy</p>
14.	$\frac{4}{\sqrt{5} + \sqrt{2}} - \frac{3}{\sqrt{5} - \sqrt{2}}$ $\frac{4(\sqrt{5} - \sqrt{2}) - 3(\sqrt{5} + \sqrt{2})}{(\sqrt{5} + \sqrt{2})(\sqrt{5} - \sqrt{2})}$ $\frac{4\sqrt{5} - 4\sqrt{2} - 3\sqrt{5} - 3\sqrt{2}}{5 - 2}$ $\frac{\sqrt{5} - 7\sqrt{2}}{3}$	<p>M1</p> <p>M1</p> <p>A1</p>	<p>Numerator correctly expanded</p> <p>Denominator rationalized accuracy</p>
15.	$\text{actual perimeter} = 5.6 + 6.5 + 7.9 = 20.0 \text{ cm}$ $\text{max. perimeter} = 5.65 + 6.55 + 7.95 = 20.15 \text{ cm}$ $\text{min. perimeter} = 5.55 + 6.45 + 7.85 = 19.85 \text{ cm}$ $\% \text{ error} = \frac{1}{2} \times \frac{(20.15 - 19.85)}{20.0} \times 100\%$ $= 0.75\%$	<p>B1</p> <p>M1</p> <p>A1</p>	<p>For both max. and min. perimeter</p> <p>Expression for % error</p> <p>accuracy</p>
16.	 <p>b)</p> $\text{surface area} = (1.5 \times 2.5 \times 2) + (1.0 \times 2.5 \times 2) + (1.5 \times 1.0 \times 2)$ $= 7.5 \text{ cm}^2 + 5.0 \text{ cm}^2 + 3.0 \text{ cm}^2 = 15.5 \text{ cm}^2$	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p> <p>O4</p>	<p>Net correctly completed</p> <p>All vertices correctly labelled</p>

No.	Working	Marks	Comments
17.	$\angle BAC = 45^\circ$ (base angles of an isosceles Δ) a)i) $\angle DAC = 180^\circ - (90 + 25) = 65^\circ$ (angle sum of a Δ) $\angle BAD = 65^\circ + 45^\circ = 110^\circ$ ii) $\angle BOD \text{ reflex} = (45 + 25) \times 2 = 140^\circ$ angle subtended at the centre by same chord is twice that at the circumference $\angle BGD = 70^\circ$ iii) (angle subtended by same chord in same segment are equal) $\angle ABE = 45^\circ$ (alternate segment theorem) b) $\angle CBF = 45^\circ$ (alternate segment theorem) $\therefore \angle ABE = \angle CBF = 45^\circ$	B1 B1 B1 B1 B1 B1 B1 B1	
		10	

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No.	Working								Marks	Comments
18.	x	-4	-3	-2	-1	0	1	2	B2	All values correct
	y	13	3	-3	-5	-3	3	13		
									S1	Linear accommodative scale
									P1	All points correctly plotted
									C1	Smooth curve
									L1	Correct line drawn
										Correct points read
										Correct points read
	c) roots $x = -2.5$ or $x = 1.5$								B1	Forming quadratic equation
	d)ii) points $(-1, -5)$ and $(-3, 3)$								B1	accuracy
	$x = -1$ and $x = -3$								M1	
	e) quadratic equation: $(x+1)(x+3) = 0$								A1	
	$x^2 + 4x + 3 = 0$									
	$2x^2 + 4x - 3 = -4x - 9$									
	OR $2x^2 + 8x + 6 = 0$									
	$x^2 + 4x + 3 = 0$									

No.	Working	Marks	Comments
19.	 <p>a) $EB = 76 \tan 41$ $EB = 66.07 \text{ m}$</p> <p>b) $EC = \frac{66.07}{\cos 59}$ $EC = 128.3 \text{ m}$</p> <p>c) $BC = 66.07 \tan 59 = 110.0 \text{ m}$ $ED = \frac{68 \sin 116}{\sin 24} = 150.3 \text{ m}$ $AE = \frac{76}{\cos 41} = 100.7 \text{ m}$ $perimeter = 76 + 110.0 + 68 + 150.3 + 100.7 = 505 \text{ m}$</p> <p>$perimeter \text{ to be fenced} = (505.0 + 66.07 + 128.3) - (3 \times 2.7) = 691.27 \text{ m}$</p> <p>d) $no. \text{ of rolls} = \frac{691.27 \times 7}{580} = 8.343$ $\approx 9 \text{ rolls}$</p>	<p>M1 A1</p> <p>M1 A1</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	
		10	
20.	 <p>indirect congruence</p>	<p>B1 B1 B1 B1</p> <p>B1</p> <p>B1</p> <p>B1 B1 B1 B1</p>	<p>Object PQR drawn Centre shown and used Image P'Q'R' drawn Coordinates of P' (3,3), Q' (0,3) and R' (2,1) Points P'Q'R' correctly rotated Triangle P''Q''R'' correctly drawn Coordinates P''(-3,3) R''(-1,2) and Q''(-3,0) Image P'''Q'''R''' drawn Coordinates P'''(-3,-3) Q'''(-3,0) and R'''(-1,-2)</p> <p>Type of congruence</p>
		10	
21.	a) Modal frequency = 15	B1	Modal frequency

b)

<i>class</i>	<i>f</i>	<i>x</i>	<i>fx</i>	<i>c.f.</i>
30 – 39	3	34.5	103.5	
40 – 49	4	44.5	178	
50 – 59	12	54.5	654	19
60 – 69	15	64.5	967.5	34
70 – 79	9	74.5	670.5	43
80 – 89	4	84.5	338	47
90 – 99	3	94.5	283.5	50
			$\sum fx = 3195$	

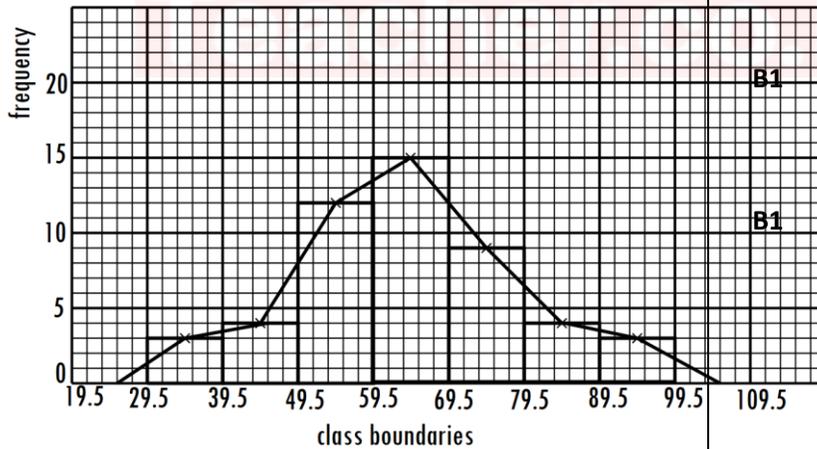
$$\bar{x} = \frac{3195}{50}$$

$$= 63.9$$

c) $median = 59.5 + \frac{(25-19)}{12} \times 10$

$$= 64.5$$

d)



B1

Fx column

M1

A1

c.f. column

B1

M1

A1

S1

Accommodative scale of 19.5 to 109.5

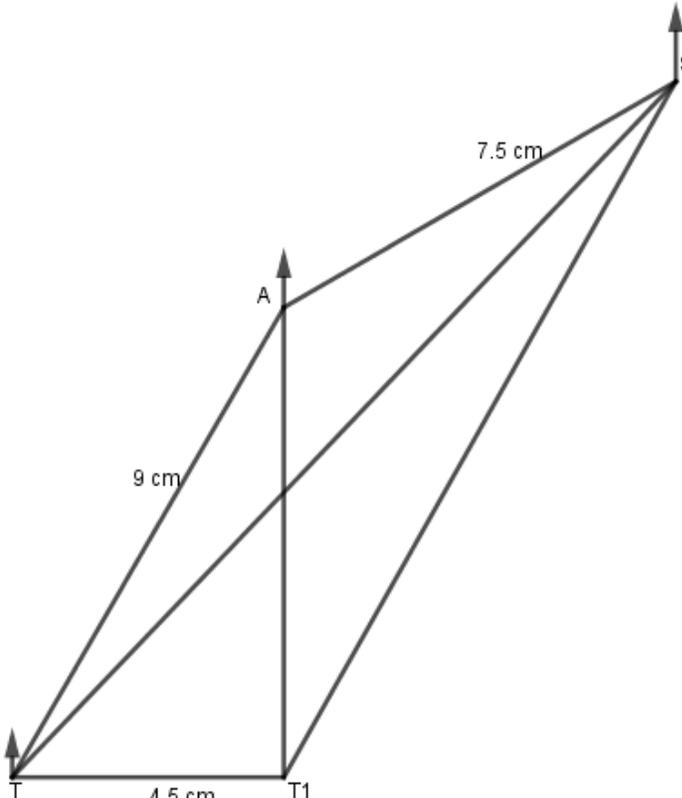
Correct histogram bars

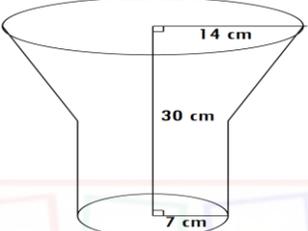
Correct frequency polygon(should touch the x-axis on both sides)

B1

B1

10

<p>22.</p>  <p>b) i) $ST = 15.9 \pm 0.1$ $ST = 15.9 \times 200 = 3180 \text{ km} \pm 20 \text{ km}$</p> <p>ii) $224^{\circ} \pm 1^{\circ}$</p> <p>c) i) $7.8 \text{ cm} \times 200 = 1560 \text{ km} \pm 20$ ii) 2090 ± 10</p>		<p>S1 Appropriate scale used</p> <p>B1 Distances AS and AT determined</p> <p>B1 Locating S</p> <p>B1 Locating T</p> <p>B1 ST in cm</p> <p>B1 ST in km</p> <p>B1 Bearing 224°</p> <p>B1 Locating AT AT1 =</p> <p>B1</p> <p>B1</p>	
		<p>10</p>	
<p>23.</p>	<p>a)(i) $\frac{22}{7} \times 7^2 \times 10 = 1540.00 \text{ cm}^3$</p> <p>(ii)</p> $\frac{7}{14} = \frac{h}{h+20}$ $7h + 140 = 14h$ $h = 20 \text{ cm}$ <p>vol. of frustum = $\frac{1}{3} \times \frac{22}{7} \times 14^2 \times 40 - \frac{1}{3} \times \frac{22}{7} \times 7^2 \times 20$</p> $8213\frac{1}{3} - 1026\frac{2}{3}$ $= 7186.67 \text{ cm}^3$	<p>B1 Volume</p> <p>M1 Finding h</p> <p>A1 $h = 20 \text{ cm}$</p> <p>M1 expression for volume</p> <p>accuracy</p> <p>A1</p> <p>total volume</p> <p>B1</p>	

	<p>7186.67 + 1540.00 (iii) = 8726.67 cm³</p> <p>b) lsf = 30cm : 6000cm = 1 : 200 vsf = 1 : 8000000 actual volume = 8000000 × 8726.67 = 69 813 360 000 cm³ mass = 69 813 360 000 × 0.84 58 643 222 400g <u>58 643 222 400</u> 1000 × 1000 58 643.222 tonnes</p> 	<p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>Expression for actual volume</p> <p>Expression for mass in grams Changing to tonnes</p> <p>Accuracy</p>
		<p>10</p>	
<p>24.</p>	<p>a)i) taxable income = (26000 + 15000 + 2000) × $\frac{12}{20}$ Kenya pounds 25 800</p> <p>ii) 1st slab = 5220 × 2 = Ksh 10 440 2nd slab = 5220 × 3 = Ksh 15 660 3rd slab = 5220 × 4 = Ksh 20 880 4th slab = 5220 × 5 = Ksh 26 100 5th slab = 4920 × 6 = Ksh 29 520 Gross tax per month = $\frac{102\ 600}{12}$ = Ksh 8 550</p> <p>iii)</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>M1</p> <p>A1</p>	<p>Exp. For taxable income Accuracy</p> <p>1st slab</p> <p>2nd, 3rd, 4th and 5th slabs</p> <p>Expression for gross tax per month accuracy</p>

$net\ tax = 8550 - 1800$ $Ksh\ 6\ 750$		
b) $net\ income = 43000 - (520 + 1500 + 5600 + 4000 + 6750)$ $43000 - 18370$ $Ksh\ 24\ 630$	M1 A1	
	10	

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