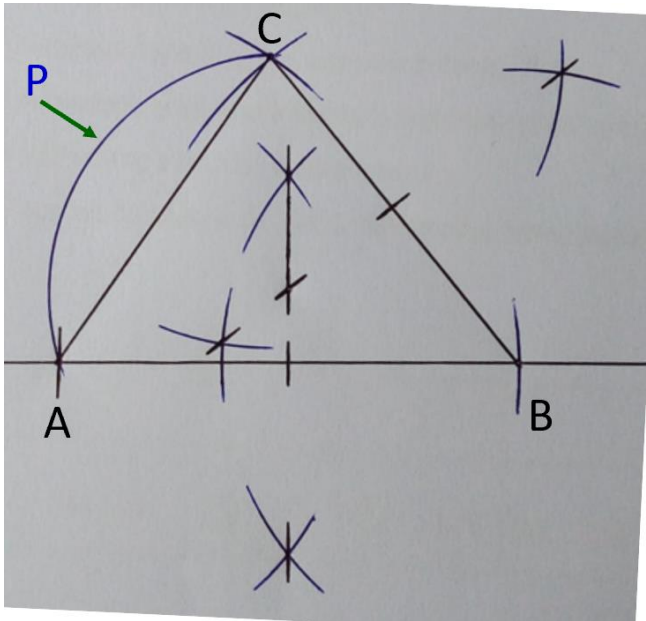


MARKING SCHEME

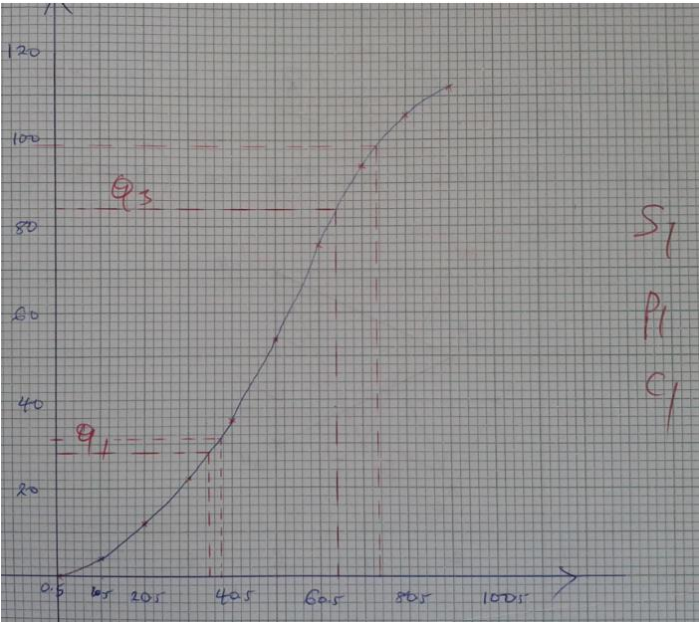
KALA TRIALS 2026, MATHS P2

Qn	Workings	Marks	Comments
1	$\frac{200(3) + 250(5)}{3 + 5}$ $= \text{Sh. } 231.25$ Profit = Sh. 8.75 $\text{Hence; } \frac{8.75}{231.25} \times 100$ $= 3.784 \%$	M1 M1 A1	
		3	
2	$\left. \begin{array}{l} a - d = 2 \\ (a + 7d) - (a + 3d) = 24 \end{array} \right\}$ $a + 7d - a - 3d = 24$ $d = 6 \text{ and } a = 8$ $\therefore S_{20} = \frac{20}{2} [2(8) + 19(6)]$ $= 1300$	M1 A1 M1 A1	Both answers correct
		4	
3.	$\bar{x} = \frac{35}{5} = 7$ $= \sqrt{\frac{\sum d^2}{N}} = \frac{40}{5}$ $= 2\sqrt{2}$	B1 M1 A1	Mean obtained Exact answer only
4	$\tan \theta = \frac{8}{6}$ $\theta = 53.13^\circ$	M1 A1	$\theta = \tan^{-1} \left(\frac{8}{6} \right)$
		2	
5	$\log_{10} \left(\frac{A+B}{3+x} \right) = Z$ $\frac{A+B}{3+x} = 10^Z$ $A+B = (3+x)10^Z$ $\text{Therefore; } A = (3+x)10^Z - B$	M1 M1 A1	
		3	

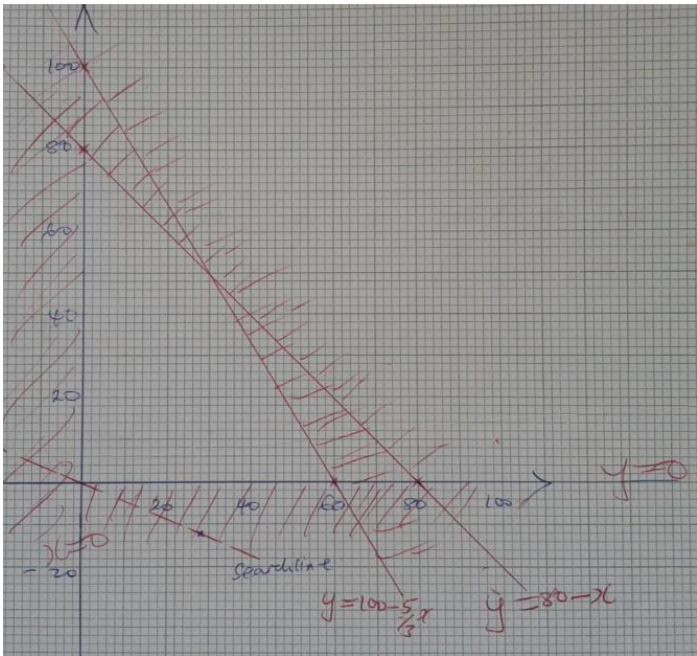
6	$ASF = \frac{64}{4} = 16$ $n^2 + 7 = 16$ $n = \pm 3$	B1 M1 A1	
		3	
7		B1 B1 B1	Perpendicular bisector locus constructed Perpendicular bisector locus constructed Locus of P drawn
		3	
8	$\vec{t} = -2\vec{p} + 3\vec{q}$ $\vec{t} = -2\begin{pmatrix} 2 \\ -3 \\ 1 \end{pmatrix} + 3\begin{pmatrix} 3 \\ -4 \\ -3 \end{pmatrix}$ $= \begin{pmatrix} 5 \\ -6 \\ -11 \end{pmatrix}$ $\therefore T(5, -6, -11)$	M1 A1 B1	
		3	
9	$30x = 105000 \left(1 + \frac{18}{100} \times \frac{1}{12}\right)^{2.5 \times 12}$ $30x = 164123.4232$ $x = \text{Ksh. } 5471$	M1 M1 A1	
		3	

10(a)	$(1)1^9x^0 + (9)1^8x^1 + (36)1^7x^2 + (84)1^6x^3$ $= 1 + 9x + 36x^2 + 84x^3$	M1 A1	
10(b)	$1 + 9(-0.01) + 36(-0.01)^2 + 84(-0.01)^3$ $= 2.109$	M1 A1	
		4	
11	Max: $6.45 \times 7.325 \times 8.25 = 389.78$ Max: $6.35 \times 7.315 \times 8.15 = 378.57$ Max: $6.4 \times 7.32 \times 8.2 = 384.15$ $\therefore \frac{5.605}{384.15} \times 100$ $= 1.46 \%$	M1 M1 A1	Any one correct All values correct
		3	
12	$BA = \sqrt{26^2 - 10^2} = 24cm$ $\frac{1}{2} \times 10 \times 24$ Angle AOC: $\cos \theta = \frac{10}{26}$ $\frac{67.38}{360} \times \frac{22}{7} \times 10^2$ $\therefore 120 - 58.82$ $= 61.18 cm^2$	B1 M1 M1 A1	Correct tangent length Area of Δ OAC Area of Δ OAC
		4	
13	$\frac{dy}{dx} = 2x - 4 = 0$ $x = 2$ $y = (2)^2 - 4(2) + 5 = 1$ $\therefore (2, 1)$	M1 A1 B1	Both x and y correct
		3	
14	$\frac{18 - 4\sqrt{18}}{3 - 2\sqrt{2}}$ $\frac{(18 - 12\sqrt{2})(3 + 2\sqrt{2})}{(3 - 2\sqrt{2})(3 + 2\sqrt{2})}$ $\frac{54 + 36\sqrt{2} - 36\sqrt{2} - 48}{9 - 8}$ $= 6$	M1 M1 A1	Numerator simplified Correct use of conjugate
		3	

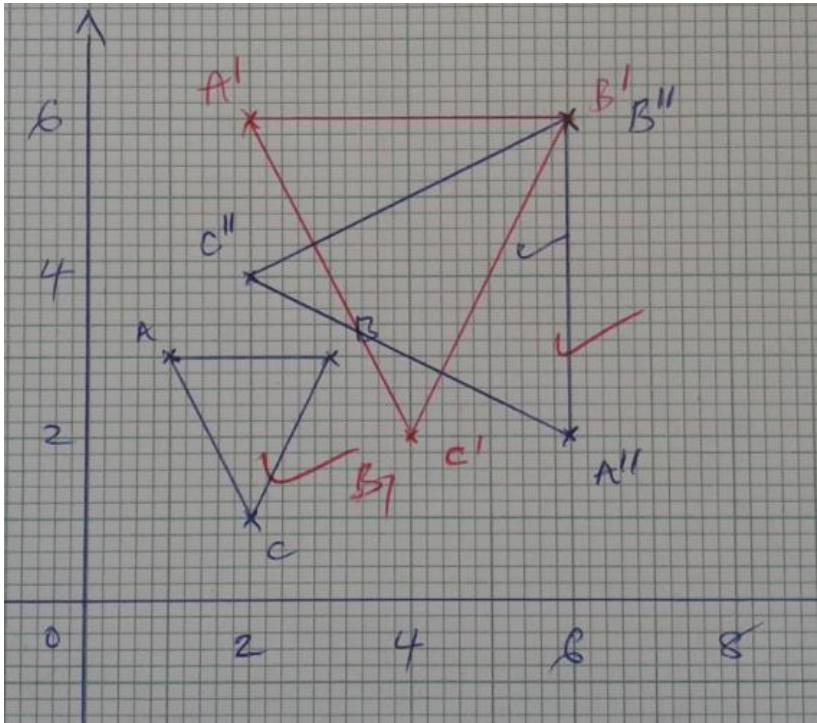
15	Centre: $\left(\frac{-2-2}{2}, \frac{2+6}{2}\right) = (-2, 4)$ Radius: $(-2+2)^2 + (2-4)^2 = r^2 = 4$ $\therefore (x+2)^2 + (y-4)^2 = 4$	B1 M1 A1	Centre identified Expansion not needed
		3	
16	$2 \frac{\sin^2 \theta}{\cos^2 \theta} = \frac{1}{\cos^2 \theta}$ $2 \sin^2 \theta = 1$ $\sin \theta = \pm \frac{1}{\sqrt{2}}$ $\theta = 45^\circ, 135^\circ, 225^\circ, 315^\circ$	M1 M1 A1	Simplified equation Also; $\cos \theta = \pm \frac{1}{\sqrt{2}}$
		3	
17(a)	$Z = \frac{kx^2}{\sqrt{y}}$	B1	
17(b)	$3 = \frac{36k}{\sqrt{18}}$ $k = \frac{\sqrt{2}}{4}$	M1 A1	Allow: 0.3536
17(c)	$Z = \frac{(1.2x)^2 k}{\sqrt{0.81y}}$ $Z = \frac{1.6x^2}{\sqrt{y}}$ $\therefore 60\% \text{ increase}$	M1 A1 B1	
17(d)	$\left. \begin{aligned} 3100 &= 3p + \frac{q}{45} \\ 5700 &= 8p + \frac{q}{65} \end{aligned} \right\}$ $7700 = \frac{77}{85}q$ $q = \text{Ksh. } 58500, \quad p = \text{Ksh. } 600$ $= \text{Ksh. } 59,100$	M1 M1 A1 B1	$F = pL + \frac{q}{N}$ Correct equations Equation in one unknown
		10	
18	Gross tax = 6075.75 + 1162 $= 7237.75$	M1 A1	Gross Tax

	Income (Ksh) Tax (Ksh) 7237.75 10165 x 0.1 = <u>1016.50</u> 6221.25 9575 x 0.15 = <u>1436.25</u> 4785 9576 x 0.2 = <u>1915.2</u> 2869.8 9576 x 0.25 = <u>2394.0</u> Last 0.3x = <u>475.8</u> $X = \frac{475.8}{0.3} = 1586$ ∴ Total income = 10165 + 9575 + (9576 x 2) + 1586 = Ksh. 40,478	M1 M1 M1 A1 M1 A1	1st two slabs 2nd two slabs Obtaining x Addition of correct values
18(b)	Basic = 40478 – 10480 = Ksh 29,998	M1 A1	
		10	
19(a)		S1 P1 C1	Correct scale All points correctly plotted Smooth continuous curve

19(b i)	Q3: $\frac{3}{4} \times 112$ Means 84th candidate = 64.5 marks Q1: $\frac{1}{4} \times 112$ Means 28th candidate = 35.5 marks $\frac{64.5 - 35.5}{2} = 14.5 \text{ marks}$	M1 A1	Any Q1 or Q3 correct
19(b ii)	31 students failed $\therefore \frac{31}{112} \times 100$ $= 27.68 \%$	M1 A1	
19(b iii)	38 marks means 31 students } 74 marks means 99 students } Means; 68 students $\frac{68}{112} \times 100$ $= 60.71 \%$	B1 M1 A1	
		10	
20(a)	$2 \times \frac{22}{7} \times R = 40040$ $R = 6370$ $\frac{45}{360} \times 2 \times \frac{22}{7} \times 6370 \cos \theta = 3810$ $\cos \theta = \frac{3810}{5005}$ $\theta = 40.43^\circ$	M1 A1 M1 M1 A1	
20(b)	$\text{Time} = \frac{3810}{200}$ $= 19 \frac{1}{20} \text{ hrs}$ $2400 - 1600 = 0800 \text{ hrs}$ $1903 - 0800$ $= 1103 \text{ hrs}$	M1 A1 M1 M1 A1	
		10	
21(a)	$x + y \leq 80$ $30x + 18y \leq 1800$ $\left. \begin{array}{l} x \geq 0 \\ y \geq 0 \end{array} \right\}$	B1 B1 B1	Both inequalities

21(b)		B1 B1 B1 B1	Correct line drawn & correct shading
21(c)	Search line: $y = \frac{3}{7}x$ Maximum point: (0, 80) $\therefore$ Maximum profit: $600(0) + 400(80)$ $= \text{Ksh. } 32,000$	B1 B1 B1	Search line drawn or at least 3 points tested
		10	
22(a)	Probability (Boy) = x Probability (Girl) = $3x$	B1 B1	
22(b)	$x + 3x = 1$ $\therefore x = \frac{1}{4}$	M1 A1	
22(c) (i)	P(BBBG) or P(BBGB) or P(BGBB) or P(GBBB) $\left[\left(\frac{1}{4} \right)^3 \times \frac{3}{4} \right] \times 4$ $= \frac{3}{64}$	M1 A1	
22(c) (ii)	P(BBBG) or P(BBGB) or P(BBGG) or P(BGBB) or P(BGBG) or P(BGGB) or P(BGGG) or P(GBBB) or P(GBBG) or P(GBGG) or P(GGBG) or P(GGGB) $\left[\left(\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{3}{4} \right) \times 4 \right] + \left[\left(\frac{1}{4} \times \frac{1}{4} \times \frac{3}{4} \times \frac{3}{4} \right) \times 4 \right]$ $+ \left[\left(\frac{3}{4} \times \frac{1}{4} \times \frac{3}{4} \times \frac{3}{4} \right) \times 4 \right]$	M1	Any two brackets correct

	$= \frac{3}{64} + \frac{9}{64} + \frac{27}{64} = \frac{39}{64}$	A1	
22(c) (iii)	P(BBBB) or P(BBGB) or P(BGBB) or P(BGGB) $\left(\frac{1}{4}\right)^4 + \left[\left(\frac{1}{4}\right)^3 \times \frac{3}{4}\right] \times 2 + \left[\left(\frac{1}{4}\right)^2 \times \left(\frac{3}{4}\right)^2\right]$ $\frac{1}{256} + \frac{3}{128} + \frac{9}{256} = \frac{1}{16}$	M1 A1	Any two parts correct
		10	
23(a)	$a = 12t - 3$ $= 12(3) - 3$ $= 33 \text{ ms}^{-2}$	M1 A1	
23(b)	$S = \left[2t^3 - \frac{3}{2}t^2 - 3t\right]_1^3$ $\left[2(3)^3 - \frac{3}{2}(3)^2 - 3(3)\right]_0^3 - \left[2(1)^3 - \frac{3}{2}(1)^2 - 3(1)\right]$ $= 35 \text{ m}$	M1 M1 A1	
23(c)	$6t^2 - 3t - 3 = 0$ $(2t + 1)(t - 1) = 0$ $= 1 \text{ second}$	M1 A1	
23(d)	$12t - 3 = 0$ $t = \frac{1}{4} \text{ sec}$ $6\left(\frac{1}{4}\right)^2 - 3\left(\frac{1}{4}\right) - 3 = 0$ $= -3 \text{ ms}^{-1}$	B1 M1 A1	
		10	
24(i)	$\begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} \begin{pmatrix} 1 & 3 & 2 \\ 3 & 3 & 1 \end{pmatrix} = \begin{pmatrix} 2 & 6 & 4 \\ 6 & 6 & 2 \end{pmatrix}$		B1 Resultant matrix

			B1 Object drawn B1 Image drawn
24(ii)	$\frac{1}{2} \times 4 \times 4$ $= 8 \text{ square units}$	M1 A1	
24 (iii)	$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 2 & 6 & 4 \\ 6 & 6 & 2 \end{pmatrix} = \begin{pmatrix} 6 & 6 & 2 \\ 2 & 6 & 4 \end{pmatrix}$	B1 B1	Resultant matrix Diagram $A^{11}B^{11}C^{11}$ drawn
24 (iv)	Reflection in the line $y = x$	B1	
24 (v)	$\begin{pmatrix} a & c \\ b & d \end{pmatrix} \begin{pmatrix} 6 & 6 \\ 2 & 6 \end{pmatrix} = \begin{pmatrix} 1 & 3 \\ 3 & 3 \end{pmatrix}$ $= \begin{pmatrix} 0 & \frac{1}{2} \\ \frac{1}{2} & 0 \end{pmatrix}$	<u>Alternatively:</u> $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 2 & 0 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$ $\therefore \frac{1}{-4} \begin{pmatrix} 0 & 2 \\ 2 & 0 \end{pmatrix}$ $= \begin{pmatrix} 0 & \frac{1}{2} \\ \frac{1}{2} & 0 \end{pmatrix}$ M1 A1	
		10	