



ALLIANCE MATHEMATICS FORUM EXAMS MATH PP2 POST-MOCK

KENYA CERTIFICATE OF SECONDARY EDUCATION

SEPTEMBER 2025

MATHEMATICS POST-MOCK

121/2

MATHEMATICS ALT. A

PAPER 2

MARKING SCHEME

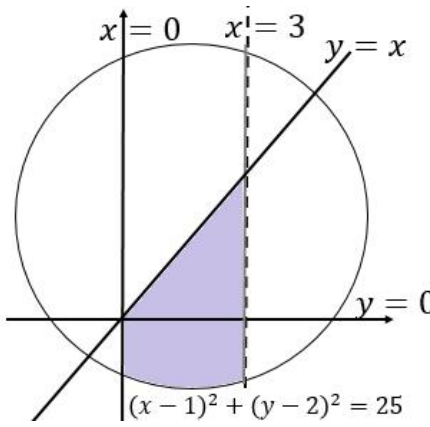
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N O	WORKINGS	MARKS	COMMENTS
1.	Find k if $25x^2 - k + 9$ is a perfect square $4ac = b^2$ $4 \times 25 \times 9 = k^2$ $900 = k^2$ $K = 30$	Marks M1 M1 A1	
2.	Max area $15.5 \times 8.5 = 131.75 \text{ cm}^2$ Actual area $15 \times 8 = 120 \text{ cm}^2$ Min area $14.5 \times 7.5 = 108.75 \text{ cm}^2$ Absolute error $\frac{\text{max} - \text{min}}{2}$ $\frac{131.75 - 108.75}{2} = 11.5$ Relative error $= \frac{\text{absolute}}{\text{actual}} = \frac{11.5}{120} = 0.09583$	M1 M1 A1	(all correct)
		03	
3.	$2\cos^2 x - \sin x = 1$ $\cos^2 x + \sin^2 x = 1$ $2(1 - \sin^2 x) - \sin x = 1$ $2 - 2\sin^2 x - \sin x = 1$ Let y represent $\sin x$ $2 - 2y^2 - y = 1$ $2y^2 + y - 1 = 0$ $Y = 0.5 \text{ or } -1$ (ignore -1) $X = 30^\circ$ Second quadrant $x = 150^\circ$ $X = 2.618 \text{ rads}$	M1 M1 A1	

		03	
4.	$\text{Log}_2(x+5) = 2 - \log_2(x+2)$ $\text{Log}_2(x+5) = \log_2 4 - \log_2(x+2)$ $\text{Log}_2(x+5) = \log_2 \left(\frac{4}{x+2} \right)$ $(x+5) = \left(\frac{4}{x+2} \right)$ $X^2 + 7x + 6 = 0$ $X = -1 \text{ or } -6$	M1 M1 A1	
		03	
5.	$\frac{\sin 150^\circ - \sin 60^\circ}{\tan 240^\circ}$ $\frac{\frac{1}{2} - \frac{\sqrt{3}}{2}}{\sqrt{3}}$ $\frac{\frac{1}{2} - \frac{\sqrt{3}}{2}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$ $\frac{\frac{\sqrt{3}}{2} - \frac{3}{2}}{3}$ $\frac{\sqrt{3}}{6} - \frac{3}{6} = \frac{\sqrt{3}-3}{6}$	M1 M1 A1	
		03	
6.	$180^\circ - (70 \times 2)^\circ$ $= 40^\circ$ $= 40 \times 60$ $= 2400 \text{ nm}$	B1 M1 A1	
		03	

7.	$a+d, a+5d, a+15d, \dots$ $\frac{a+5d}{a+d} = \frac{a+15d}{a+5d}$ $a^2 + 10ad + 25d^2 = a^2 + 16ad + 15d^2$ $10d^2 - 6ad = 0$ $2d(5d - 3a) = 0$ $d = 0 \text{ or } d = \frac{5}{3}a \dots (i)$ $55 = 27.5 = \frac{5}{2}[2a + (5-1)d]$ $11 = 2a + 4d \dots (ii)$ $11 = 2a + 4\left(\frac{5}{3}a\right)$ $a = 2.5$	M1 M1 A1	
		03	
8.	Displacement (metres) Time (seconds) $m = \frac{25 - 20}{5 - 0} = 1$ $m = \frac{28 - 22.5}{3 - 7} = -1.375$	M1 A1 M1 A1	Tangent drawn and used correctly

9.	$\frac{-2}{1} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix} + \frac{3}{1} \begin{pmatrix} 4 \\ 5 \\ -3 \end{pmatrix}$ $= \begin{pmatrix} -2 \\ -4 \\ -6 \end{pmatrix} + \begin{pmatrix} 12 \\ 15 \\ -9 \end{pmatrix}$ $= \begin{pmatrix} 10 \\ 11 \\ -15 \end{pmatrix}$ $= M(10, 11, -15)$	M1 A1 B1	
		03	
10.	$6 = \frac{k(16)^2}{\sqrt[4]{16}}$ $k = \frac{3}{64}$ $P = 3/64 \frac{Q^2}{\sqrt[4]{R}}$ $P = 3/64 \frac{15^2}{\sqrt[4]{6561}}$ $= 1 \frac{11}{64}$	M1 M1 A 1	
		03	
11.	$T.I = 23000 + 9000 = 32000$ $slab\ 1; 10\%(8700) = 870$ $slab\ 2; 15\%(17400 - 8700) = 1305$ $slab\ 3; 20\%(26100 - 17400) = 1740 +$ $slab\ 4; 25\%(32000 - 26100) = 1475$ $Gross\ tax = 5390$ $net\ tax = 5390 - 1040 = 4350$ $N.\ pay = (23000 + 9000 + 5000) - (4350 + 850 + 1200)$ $= 30600$	M1 M1 A1	
		03	

12.		B1 B1 B1 B1	Correct lines and shading $x = 0$ $x = 3$ $y = x$ Correct circle and shading
		03	
13.	$(1)(2x)^5(-3y)^0 + (5)(2x)^4(-3y)^1 + (10)(2x)^3(-3y)^2$ $32x^5 - 240x^4y + 720x^3y^2$ $2x - 3y = 4 - 0.15$ $32(2)^5 - 240(2)^4(0.05) + 720(2)^3(0.05)^2$ $= 846.4$	B1 M1 A1	
		03	
14.	$4y^2 = 4(7+x)(7-x)$ $x^2 + y^2 = 49$ $\therefore \frac{22}{7} \times 7^2$ $= 154 \text{ cm}^2$	B1 M1 A1	Equation of a circle
		03	
15.	For $y = x^2$ when $y = 1$; $x = 1$ or -1 and when $y = 4$; $x = 2$ or -2 Area under the curve with $x = 0$ and $x = 2$ $\int_0^2 x^2 = \frac{8}{3}$ Area of the rectangle $4 \times 2 = 8$ Area of the required region $8 - \frac{8}{3} - 1 + \frac{1}{3}$ $= 4\frac{2}{3}$ sq. units	M1 M1 A1	
		03	

16.	Using point (1, 1) we get the search line; $3x + 4y = 7$ $\therefore$ Minimum point (0, 4) Maximum point (2, 5)	B1 B1 B1	For correct search line drawn anywhere on the diagram Allow inspection using a minimum of 3 points, including the correct points. For minimum point For maximum point
		03	
SECTION 11 MARKING SCHEME			
17.	a. Profit per ml of mixture (with 20% profit) Total cost of 8 ml mixture $5 \times 25 + 2 \times 30 + 1 \times 45 = 230$ $230 \div 8 = \text{Ksh. } 28.75$ $28.75 \times 1.20 = \text{Ksh. } 34.50$ Profit = $34.50 - 28.75 = \text{Ksh. } 5.75$ b. New cost prices: i. $A = 25 \times 1.10 = 27.50$, $B = 30 \times 1.10 = 33.00$, $C = 45 \times 1.10 = 49.50$ New cost of 8 ml mixture: $5 \times 27.50 + 2 \times 33.00 + 1 \times 49.50 = 253$ $253 \div 8 = 31.625$ Selling price for 15% profit $31.625 \times 1.15 = \text{Ksh. } 36.36875$ $\rightarrow \text{Ksh. } 36.35$	M1 M1 M1A1 M1 M1 A1 M1	

ii. Profit % if sold at Ksh. 45 per ml

$$SP = 45, CP = 31.625$$

$$P = 45 - 31.625 = 13.375$$

$$\% P = (13.375 \div 31.625) \times 100 \\ = 42.29\%$$

M1

A1

10

18. (a) $\begin{bmatrix} 3 & 0 \\ 1 & 1 \end{bmatrix} \begin{pmatrix} 1 & 2 & 3 \\ 1 & -3 & 0 \end{pmatrix} = \begin{pmatrix} 3 & 6 & 9 \\ 2 & -1 & 3 \end{pmatrix}$

$$A^I(3, 2), B^I(6, -1), C^I(9, 3)$$

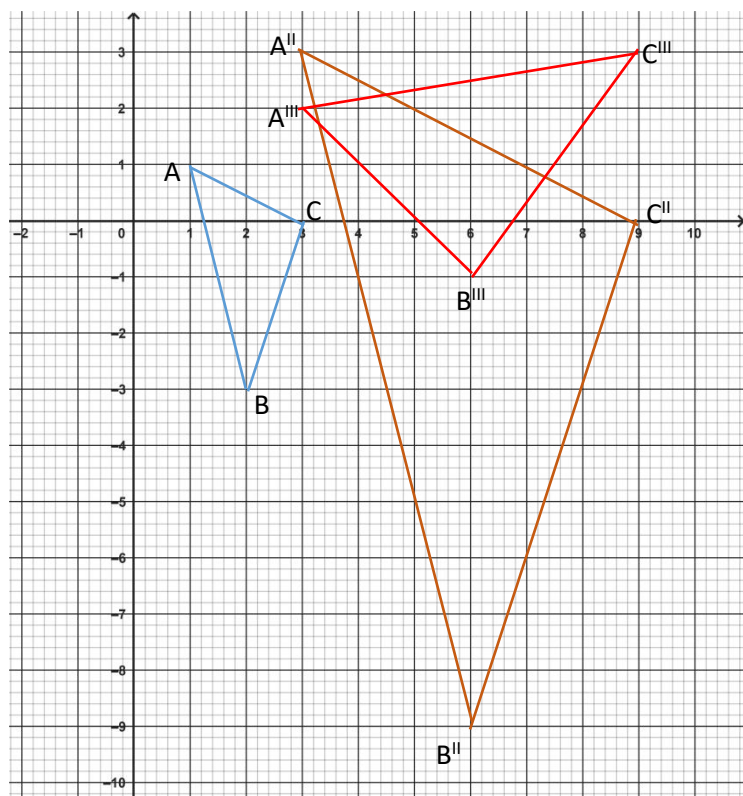
(b)

(c) (I) $\begin{bmatrix} 1 & 0 \\ -1 & 3 \end{bmatrix} \begin{pmatrix} 3 & 6 & 9 \\ 2 & -1 & 3 \end{pmatrix} = \begin{pmatrix} 3 & 6 & 9 \\ 3 & -9 & 0 \end{pmatrix}$

$$A^{II}(3, 3), B^{II}(6, -9), C^{II}(9, 0)$$

(ii) drawn

(iii) enlargement, scale factor $\frac{1}{3}$ centre (0, 0)



10

19.	(i) $\frac{125}{100} \times 24\,000$ $= 30\,000$ Amount for each installment $\frac{30\,000 - 6\,000}{15}$ $= \text{ksh } 1600$ (ii) $24000 = 18000(1 + \frac{r}{100})^{15}$ $1.01935 = 1 + \frac{r}{100}$ $r = 1.935\% \text{ per month}$ $\text{annual rate} = 12 \times 1.935$ $= 23.22\%$ (iii) (b) (I) $33600 = 24000(1 + \frac{r}{100})^{20}$ $1.01697 = 1 + \frac{r}{100}$ $r = 1.697\% \text{ per month}$ $\text{annual rate} = 12 \times 1.697$ $= 20.35\%$ (ii) plan A is cheaper It is cheaper by $33600 - 30\,000$ Ksh 3 600	M1 A1 M1 M1 A1 M1 M1 A1 B1 B1	
		10	

20.

classes	x	f	t = x - A	ft	t ²	ft ²	cf
800 - 899	849.5	3	-200	-600	40000	120000	3
900 - 999	949.5	10	-100	-1000	10000	100000	13
1000 - 1099	1049.5	25	0	0	0	0	38
1100 - 1199	1149.5	9	100	900	10000	90000	47
1200 - 1299	1249.5	3	200	600	40000	120000	50
				Σft -100		Σft^2 430000	

$$\text{Mean} = 1049.5 + \frac{-100}{50}$$

$$= 1047.5$$

$$sd = \sqrt{\frac{430000}{50} - \left(\frac{-100}{50}\right)^2}$$

$$= \sqrt{8596}$$

$$= 92.71$$

quartile deviation

$$= \frac{999.5 + \left(\frac{37.5 - 13}{25}\right)100 - 899.5 + \left(\frac{12.5 - 3}{10}\right)100}{2}$$

$$\frac{1097.5 - 994.5}{2}$$

$$= 51.5$$

B1

For correct ft

B1

For correct ft²

M1

A1

M1

M1

A1

M1

M1

A1

10

	$(x - 6)(x - 8) = 0$ $x = 6 \text{ or } 8$ $DX \text{ is either } 8 \text{ or } 6$	A1	
	$(ii) DE^2 = AE \cdot CE$ $(16 + x)x = 15^2$ $x^2 + 16x - 225 = 0$ $(x + 25)(x - 9) = 0$ $x = 9$ $AE = 25$	M1 A1	
		10	
23.	$(a) GH = \sqrt{6^2 + 5^2}$ $= 7.81 \text{ cm}$ $(b) DB = \sqrt{13^2 + 6^2}$ $= 14.32$ $\tan \theta = \frac{18}{14.32}$ $\theta = \tan^{-1} \frac{18}{14.32}$ $= 51.50^\circ$ $(c) \tan \theta = \frac{5}{6}$ $\theta = \tan^{-1} \frac{5}{6}$ $= 39.81^\circ$ $(d) 18^2 = 7.81^2 + 14.32^2 - 2 \times 7.81 \times 14.32 \cos \theta$ $\theta = \cos^{-1} -0.2583$ $= 104.97^\circ$	M1 A1 M1 A1 M1 M1 A1 M1 M1 A1	
		10	

24.

x°	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$4 \sin (x - 30)$ $- 3 \cos (x - 30)$	-4.60	-3.00	-0.60	1.96	4.00	4.96	4.60	3.00	0.60	-1.96	-4.00	-4.96	-4.60
$3 \cos (x - 60)$	1.50	2.60	3.00	2.60	1.50	0.00	-1.50	-2.60	-3.00	-2.60	-1.50	0.00	1.50

(i)

(ii)

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