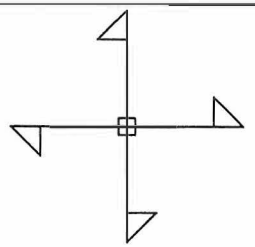
KALA MATH PP1 2024 MARKING SCHEME

No	Marking Scheme	Marks	Comments
1.	Numerator $\frac{14}{5} of \frac{25}{21} \div \frac{3}{14} - \frac{1}{4}$ $\frac{10}{3} \times \frac{14}{3} - \frac{1}{4}$ $= \frac{551}{36}$ Denominator $\frac{23}{8} + \frac{13}{8}$ $= \frac{36}{8}$ $\frac{551}{36} \div \frac{36}{8}$ $= 3\frac{65}{162}$	M1 M1 A1 3	
2.	$\frac{80}{100} \times 5500 \times 201.15 \times 0 \cdot 95$ $= 840807$ $840807 - 772204.5 = 68602.5$ $= \frac{6860215}{152.45}$ $= 450$ US dollars	M1 M1 A1 3	
3.	3 | 243 | 270 | 324 3 | 81 | 90 | 108 3 | 27 | 30 | 36 | 9 | 10 | 12 $GCD = 3 \times 3 \times 3 = 27$	M1	

No	Marking Scheme	Marks	Comments
	$Total\ number\ of\ pieces = \frac{243}{27} + \frac{270}{27} + \frac{324}{27}$ $= 9 + 10 + 12$ $= 31$	M1 A1 3	
4.		B1 B1 B1 3	
5.	1.3 rad = 74.48° $\frac{285.52}{360} \times 2 \times \frac{22}{7} \times 10.5 + 10.5 + 10.5$ $= 73.35\ cm$	M1 M1 A1 3	
6.	$Cos\ 3x = -\frac{1}{2}$ $3x = cos^{-1}(-0.5) = 120°$ $3x = 120$ $x = 40^0$ $3x = 240$ $x = 80^0$ $3x = 480$ $x = 160^0$ $x = 40^0, 80^0 or\ 160^0$	M1 M1 A1 B1 4	
7.	$2^{6x+6} - 2^{6x-2} = 255$ $2^{6x} \times 2^6 - \frac{2^{6x}}{2^2} = 255$	M1	

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	$2^{6x}\left(64-\frac{1}{4}\right)=255$ $2^{6x}\left(\frac{255}{4}\right)=255$ $2^{6x}=2^2$ $6x=2$ $x=\frac{1}{3}$	M1 A1 3	
8.	$300=\frac{1}{2}\times 15\times x+5\times x+\frac{1}{2}(x+1.5x)5+\frac{1}{2}\times 15\times 1.5x$ $300=7.5x+5x+6.25x+11.25x$ $30x=300$ $x=10$ $1.5x=1.5\times 10$ $=15\ m/s$	M1 M1 A1 3	
9.	$\frac{2x^2-5xy-2y^2}{y(5xy+12y^2-2x^2)}$ $\frac{2x^2-8yx+3yx-12y^2}{y[2x(x-4y)+3y(x-4y)]}$ $\frac{(2x+3y)(x-4y)}{y[(3y+2x)(4y-x)]}$ $=-\frac{1}{y}$	M1 M1 A1 3	
10.	$12x=180^0$ $x=15^0$ $\angle OCB=60^0$	M1 A1 B1 3	

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11.	$155+104+(n-2)143=(2n-4)90$ $259+143n-286=180n-360$ $-37n=-333$ $n=9$ *sides*	M1 M1 A1 3	
12.	$\frac{5}{3}-2x<1-\frac{2}{3}x$ $\frac{2}{3}<\frac{4}{3}x$ $2<4x$ $\frac{1}{2}<x$ $1-\frac{2}{3}x\leq 2-x$ $\frac{x}{3}\leq 1$ $x\leq 3$ $\frac{1}{2}<x\leq 3$ Range 0,1, 2, 3	M1 M1 A1 3	

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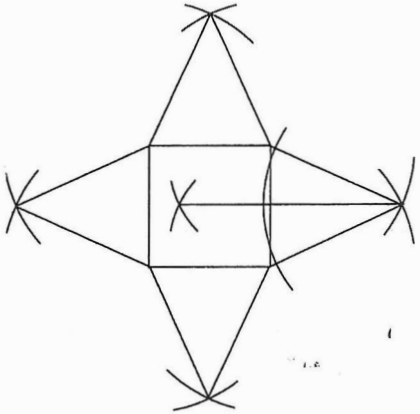
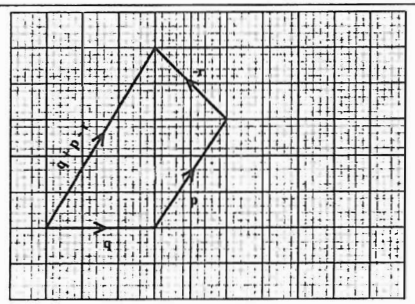
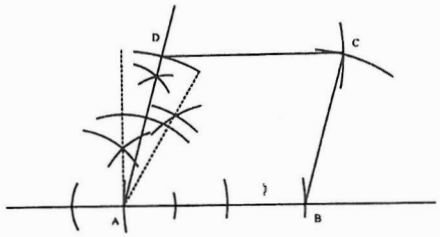
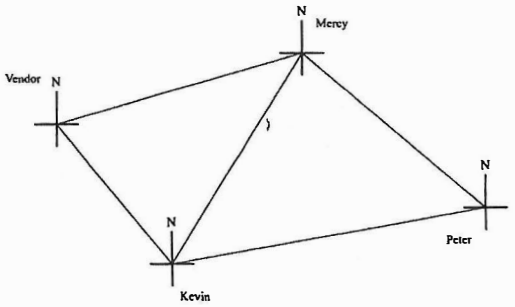
13.	(a) 	B1	
		B1	
		B1	
		B1	
	(b) $Height = 5.4\ cm \pm 0.1$	**4**	
14.		B1	
		B1	
		2	

No	Marking Scheme	Marks	Comments
15.	74 cm, 35.6 cm, 52.4 cm		
	72 cm, 32.6 cm, 50.4 cm	M1	
	$\frac{72}{12} = 6$		
	$\frac{33.0}{8.4} = 4$	M1	
	$\frac{50.4}{8.4} = 6$		
	$Total = 6 \times 4 \times 6$	A1	
	$= 144$	**3**	
16.		B1	
		B1	
		B1	
	$Length\ AC = 10.4\ cm \pm 0.1$	B1	
		4	

SECTION II (50 Marks)

No	Marking Scheme	Marks	Comments
17.	(a) $3y = -4x + 12$		
	$y = -\frac{4}{3}x + 4$	M1	
	$m_1 = m_2 = -\frac{4}{3}$		
	$\frac{y-4}{x+7} = -\frac{4}{3}$	M1	
	$3y = -4x - 16$		
	$y = -\frac{4x}{3} - \frac{16}{3}$	A1	
	Coordinates of y- intercept	B1	
	$\left(0, -5\frac{1}{3}\right)$		
	(b) $m_1 \times m_2 = -1$		
	$m_2 = \frac{3}{4}$	M1	
	$\frac{y+7}{x+5} = \frac{3}{4}$	M1	
	$3x + 15 = 4y + 28$	A1	
	$3x - 4y = 13$		
	(c) $4x + 3y = -16$		
	$3x - 4y = 13$		
	$12x + 9y = -48$		
	$12x - 16y = 52$	M1	
	$25y = -100$	A1	
	$y = -4$		
	$3x - 4(-4) = 13$		
	$x = -1$	B1	
	$(-1, -4)$		
		10	

No	Marking Scheme	Marks	Comments
18.	a) 	B1	
	b) (i) $321° \pm 1$	B1	
	(ii) $N32°E$ $\pm$	B1	
	(iii) $7.8\ cm \pm 0.1$	B1	
	$7.8 \times 10 = 78\ km$	M1 A1	
	(iv) $80 + 75 + 100 + 78$	M1	
	$= 333\ km$	A1	
		10	
19.	a)	B1	

x	f	fx
34	2	68
39	8	312
44	10	440
49	6	294
54	4	216
	$\sum f = 30$	$\sum fx = 1330$

B1

No	Marking Scheme	Marks	Comments
	$\bar{x} = \frac{\sum fx}{\sum f}$		
	$= \frac{1330}{30}$	M1	
	$= 44.33$		
	$= 44$	A1	
	b) (i)		
	Class | Tally | f | cf 32 – 36 | // | 2 | 2 37 – 41 | ///// // | 8 | 10 42 – 46 | ///// ///// | 10 | 20 47 – 51 | ///// / | 6 | 26 52 - 56 | //// | 4 | 30	B1 B1 B1	
	(ii) $Median\ age = 41.5 + \frac{(15-10)5}{10}$	M1	
	$= 41.5 + 2.5$	M1	
	$= 43.5$	A1	
		10	
20.	a) (i) $\frac{3500000}{x}$	B1	
	(ii) $\frac{3500000}{x+30}$	B1	
	b) $\frac{3500000}{x} - \frac{3500000}{x+30} = 26500$	M1	
	$26500x^2 + 78500x - 105000000 = 0$	M1	
	$7x^2 + 210x - 28000 = 0$	M1	
	$x = \frac{-210 \pm \sqrt{210^2 - 4 \times 7 \times -28000}}{2 \times 7}$	A1	
	$= \frac{-210 \pm 910}{14}$	M1	
	$= 50$	A1	

No	Marking Scheme	Marks	Comments
	c) $\frac{3500000}{5} = 70000$		
	$= 3500000 - 300000$	M1	
	$\frac{3200000}{80} = 40000$		
	$40000 : 70000$		
	$4 : 7$	A1	
		10	
21.	(i)		
	$\frac{x+20}{x} = \frac{6}{4}$	M1	
	$4x + 80 = 6x$		
	$2x = 80$	M1	
	$x = 40$		
	$Height = 40 + 20$	A1	
	$= 60$		
	(ii).		
	$Vol = \left(\frac{1}{3} \times 12 \times 18 \times 60\right) - \left(\frac{1}{3} \times 12 \times 8 \times 40\right)$	M1M1	
	$4320 - 1280$		
	$= 3040$	A1	
	(iii)		
	$\sqrt{9^2 + 60^2} = 60.71$		
	$\sqrt{6^2 + 40^2} = 40.45$	B1	
	$\sqrt{6^2 + 60^2} = 60.30$		
	$\sqrt{4^2 + 40^2} = 40.20$		
	$\left(\frac{1}{2} \times 12 \times 60.71\right) - \left(\frac{1}{2} \times 8 \times 40.45\right)$	M1	
	$202.46 \times 2 = 402.92$		

No	Marking Scheme	Marks	Comments
	$\left(\frac{1}{2}\times 18\times 60.30\right)-\left(\frac{1}{2}\times 12\times 40.20\right)$ $301.5\times 2=603$ $402.92+603+8\times 12+12\times 18$ $=1317.92$	M1 A1 **10**	
22.	(a) (i) $12+\frac{24}{2}$ $=24\ cm^2$ (ii) $24cm^2=10\ km^2$ $1cm^2=416666.67\ m^2$ $1:645.49$ (b) (i) $A=\frac{1}{2}(7.25+11.25)+2(1.25+2.75+4.75+5.25+6)$ $=49.25$ (ii) $Area=1(4+1+4+5+6+9)$ $=29$	B1 M1 A1	

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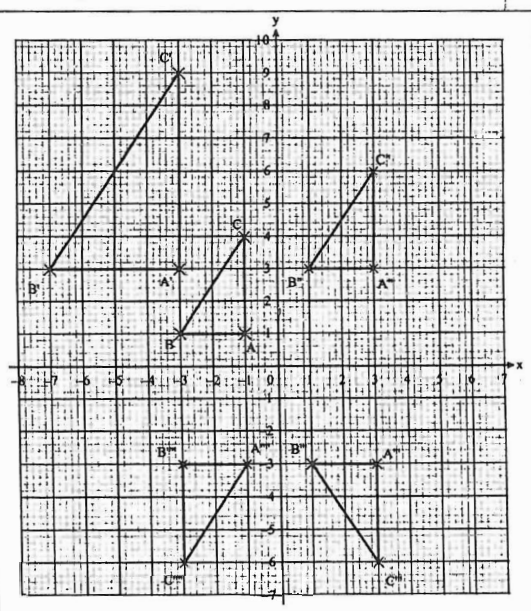
23.	 a) A(−1,1) B(−3,1) C(−1,4)	B1 B1 B1 B1 B1 B1 B1 B1 B1 **10**	
24.	(a) (i) $2x^2+4xh=1425$ $4xh=1425-2x^2$ $h=\frac{1425-2x^2}{4x}$ (ii) $V=x^2h$ $V=\frac{1425x^2-2x^4}{4x}$ $V=\frac{1425x-2x^3}{4}$ (b) (i) At maximum $\frac{dV}{dx}=0$ $\frac{dV}{dx}=\frac{1425}{4}-\frac{6x^2}{4}$	M1 M1 A1 B1 M1 M1	

No	Marking Scheme	Marks	Comments
	$\frac{1425}{4} - \frac{6x^2}{4} = 0$	M1	
	$x = 15.4$	A1	
	(ii)		
	$V = \frac{1425x - 2x^3}{4}$		
	$V = \frac{1425(15.4) - 2(15.4)^3}{4}$	M1	
	$= 5367.67$	A1	
		10	