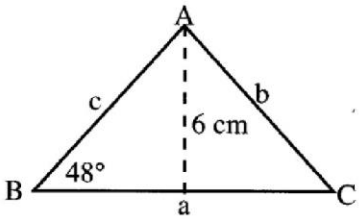
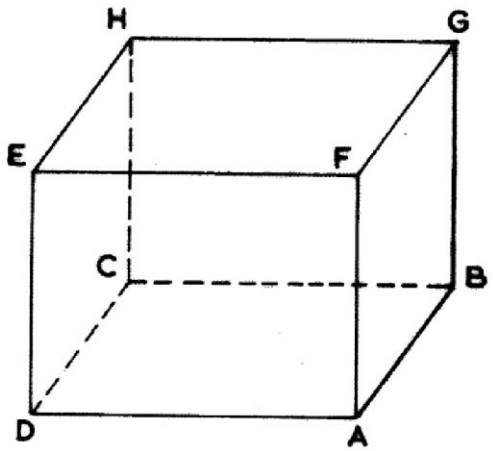
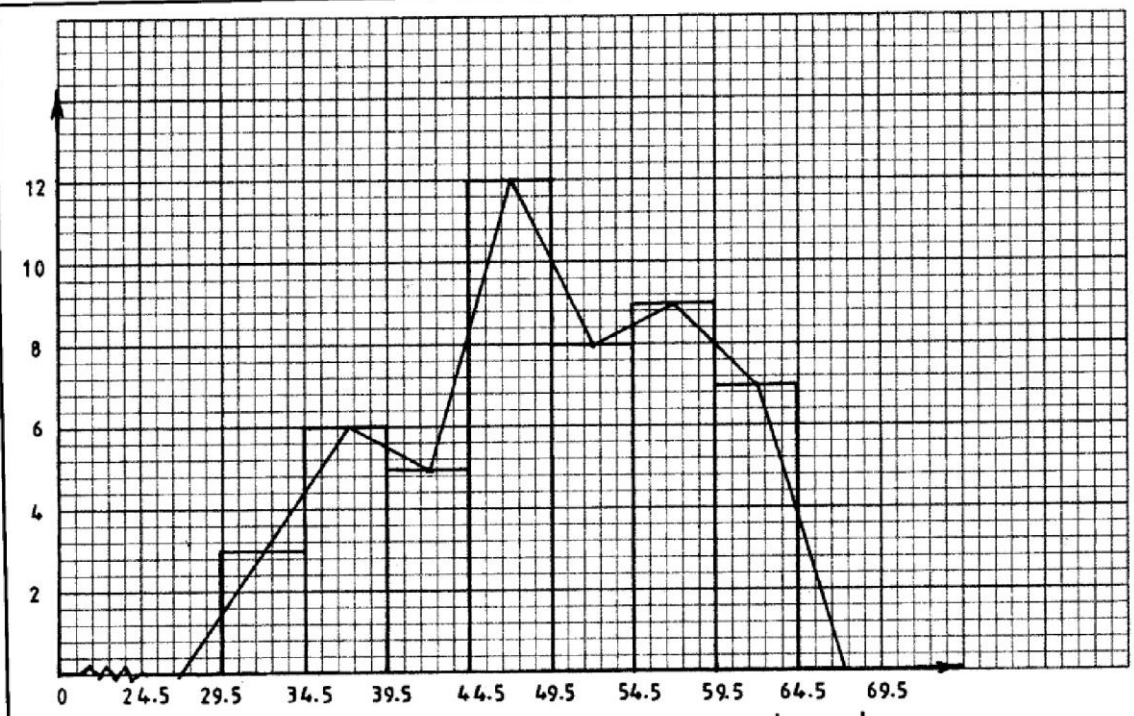
4.3 MATHEMATICS ALTERNATIVE A (121)

4.3.1 Mathematics Alternative A Paper 1 (121/1)

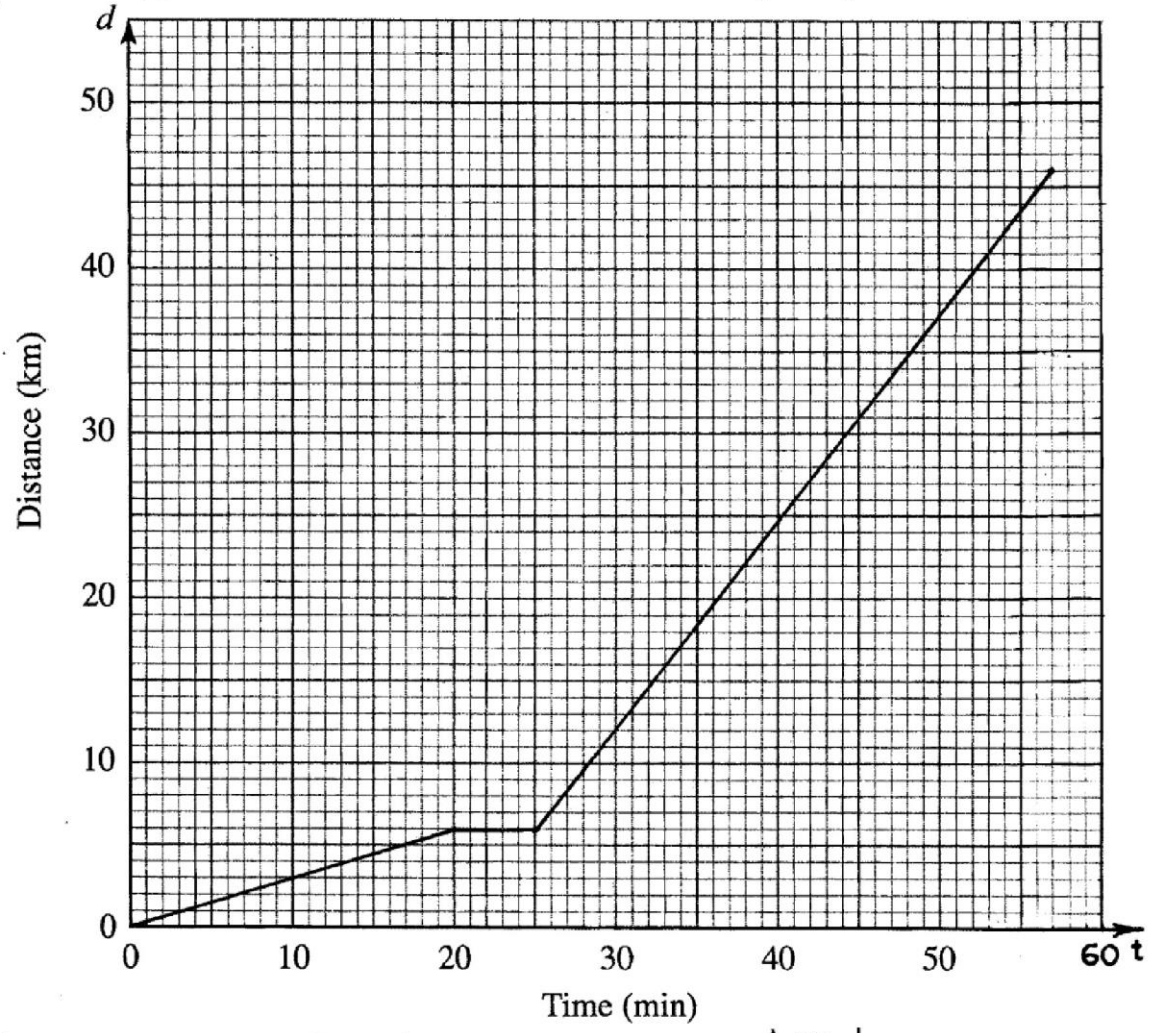
1.	(a) $540396 - 726450 \div 3$ $= 540396 - 242150$ $= 298246$ (b) Total value of digit in the thousands place $= 8000$	B1 B1 2	
2.	$6\frac{2}{3} - (\frac{7}{8} + 1\frac{1}{2})$ $= \frac{103}{24}$ Son/daughters share $= \frac{1}{2} \times \frac{103}{24}$ $= 2\frac{7}{48}$ ha	M1 M1 A1 3	
3.	$S = \sqrt[3]{1728} \quad = 12$ let the diagonal be d cm $\therefore d = \sqrt{12^2 + 12^2}$ $= 16.97$	M1 M1 A1 3	
4.	No $^-$ | Log 72.56 | 1.8607 0.64 | 1.8062 or -0.1938 | 1.6669 1.845 | 0.2660 x 2 | 0.5320 1.6669 - 0.5320 $1.1349 \div 2$ 3.694 | 0.5675	M1 M1 M1 A1 4	√ logs √ addition and subtraction √ division and multiplication

5.	$\frac{\frac{1}{2}a}{6} = \tan 42°$ $a = 12 \tan 42°$ $= 10.8$ $\frac{6}{\sin 48} = c \text{ or } b$ $= 8.07$ $\therefore$ length $= 10.8 + 2 \times 8.07$ $= 26.9$ cm	M1 M1 A1 3	
6.	Mass of A = 50 x 13.6 $= 680$ g Volume of B $= \frac{680}{11.3}$ $= 60.2$ cm^3	M1 M1 A1 3	
7.		B1 B1 2	transfer of all lines √ hidden lines and labelling of cuboid √

8.	Commission amount = 28875 - 15375 = 13500 $\therefore \frac{4.5}{100}x = 13500$ $x = 13500 \times \frac{100}{4.5}$ = 300 000	M1 M1 A1 3	
9.	(a) $(2n - 4)\,90° = \frac{360}{n} \times 24$ $n^2 - 2n - 48 = 0$ $(n - 8)(n + 6) = 0$ $n = 8$ (b) Octagon	M1 M1 A1 B1 4	
10.	 	S1 √ scale B2 All bars √ (B1 for 4 - 6 bars √) B1 frequency polygon 4	

11.	$\mathbf{P} = 5\begin{pmatrix}3\\2\end{pmatrix} - 2\begin{pmatrix}4\\1\end{pmatrix} = \begin{pmatrix}15\\10\end{pmatrix} - \begin{pmatrix}8\\2\end{pmatrix}$ $= \begin{pmatrix}7\\8\end{pmatrix}$ $\mathbf{P}' = \begin{pmatrix}7\\8\end{pmatrix} + \begin{pmatrix}-6\\4\end{pmatrix} = \begin{pmatrix}1\\12\end{pmatrix}$	M1 A1 B1 3	
12.	$\frac{4a^2 + 2b - 4c}{\frac{1}{4}(b^2 - 3a)} = \frac{4 \times 3^2 + 2 \times 5 - 4 \times \frac{-1}{2}}{\frac{1}{4}(5^2 - 3 \times 3)}$ $= \frac{4 \times 9 + 10 + 2}{\frac{1}{4}(25 - 9)}$ $= \frac{48}{4} = 12$	M1 M1 A1 3	√ substitution
13.	Area under the curve: Ordinates: 6, 2, 6 and 18 ∴ area = 2 (6 + 2 + 6 + 18) = 64	 B1 M1 A1 3	
14.	2j + 3s = 1800 7.2j + 2.4s = 4800 7.2j + 10.8s = 6480 7.2j + 2.4s = 4800 8.4s = 1680 s = 200 j = 600 New costs: Shirt - 200 × 1.2 = 240 jacket - 600 × 1.2 = 720	M1 M1 A1 B1 4	Formation of the 2 simultenous equations Attempt to solve for j or s for both values for both new costs

15.	Trapezium: $\frac{1}{2} \times 30 \times (36 + 60)$ $= 1440$ Semi circle: $\frac{1}{2} \times \frac{22}{7} \times 14 \times 14$ $= 308$ Remaining part: $1440 - 308 = 1132\ cm^2$	M1 M1 A1 3	
16.	Time of motorbike $= \frac{40}{75} \times 60 = 32$ min.	B1	

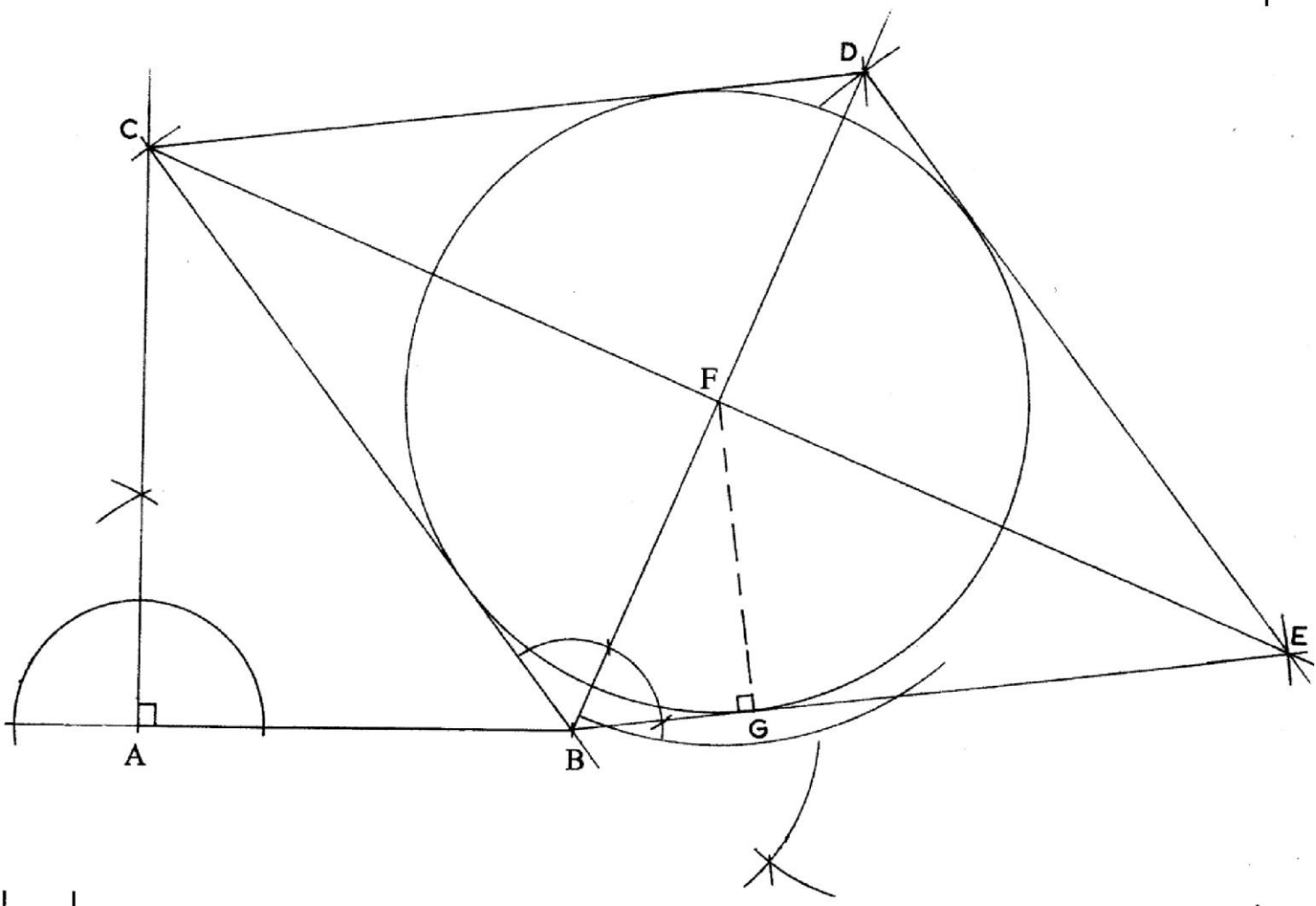


Graph for cycling and stopping Graph for motorbike	B1 B1	
	3	

17.	(a) (i) $sh\ \frac{7}{16} \times 4\,800\,000$	M1	
	$= 2100000$	A1	
	(ii) $\frac{3/4 \times 8 \times 10000\ m^2}{15 \times 25}$	M1 M1	Conversion Division by Area
	$= 160$	A1	
	(b) (i) Profit		
	$50\,000 \times 160 - 4\,800\,000$	M1	
	$= 3\,200\,000$		
	$\therefore$ Net profit $= \frac{70}{100} \times 3\,200\,000$	M1	
	$= 2\,240\,000$	A1	
	(ii) Amount earned by A and B		
	$= \frac{5-4}{16} \times 2\,240\,000$	M1	
	$= 140\,000$	A1	
		10	

18.	(a) $\begin{pmatrix}18 & 40 & 5\\15 & 30 & 6\end{pmatrix}$	B1	
	$\begin{pmatrix}45\\50\\150\end{pmatrix}$	B1	
	(b) $\begin{pmatrix}18 & 40 & 5\\15 & 30 & 6\end{pmatrix}\begin{pmatrix}45\\50\\150\end{pmatrix}$		
	$=\begin{pmatrix}18\times45+40\times50+5\times150\\15\times45+30\times50+6\times150\end{pmatrix}$	M1	
	$\begin{pmatrix}j\\w\end{pmatrix}=\begin{pmatrix}3560\\3075\end{pmatrix}$	A1	
	Difference = 3560 - 3075 = 485	B1	
	(c) Let price of rice be x and that of sugar by y		
	$\begin{pmatrix}36 & 23\\50 & 32\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}8160\\11340\end{pmatrix}$	B1	matrix equation
	inverse of $\begin{pmatrix}36 & 23\\50 & 32\end{pmatrix}=\frac{1}{2}\begin{pmatrix}32 & -23\\-50 & 36\end{pmatrix}$	B1	
	$=\begin{pmatrix}16 & -11.5\\-25 & 18\end{pmatrix}$		√ inverse matrix
	$\begin{pmatrix}16 & -11.5\\-25 & 18\end{pmatrix}\begin{pmatrix}36 & 23\\50 & 32\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}16 & -11.5\\-25 & 18\end{pmatrix}\begin{pmatrix}8160\\11340\end{pmatrix}$	M1	
	$\begin{pmatrix}1 & 0\\0 & 1\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}150\\120\end{pmatrix}$	M1	
	$\begin{pmatrix}x\\y\end{pmatrix}=\begin{pmatrix}150\\120\end{pmatrix}$		
	1 kg rice costs Sh150 1 kg sugar costs Sh120	A1	
		10	

19.

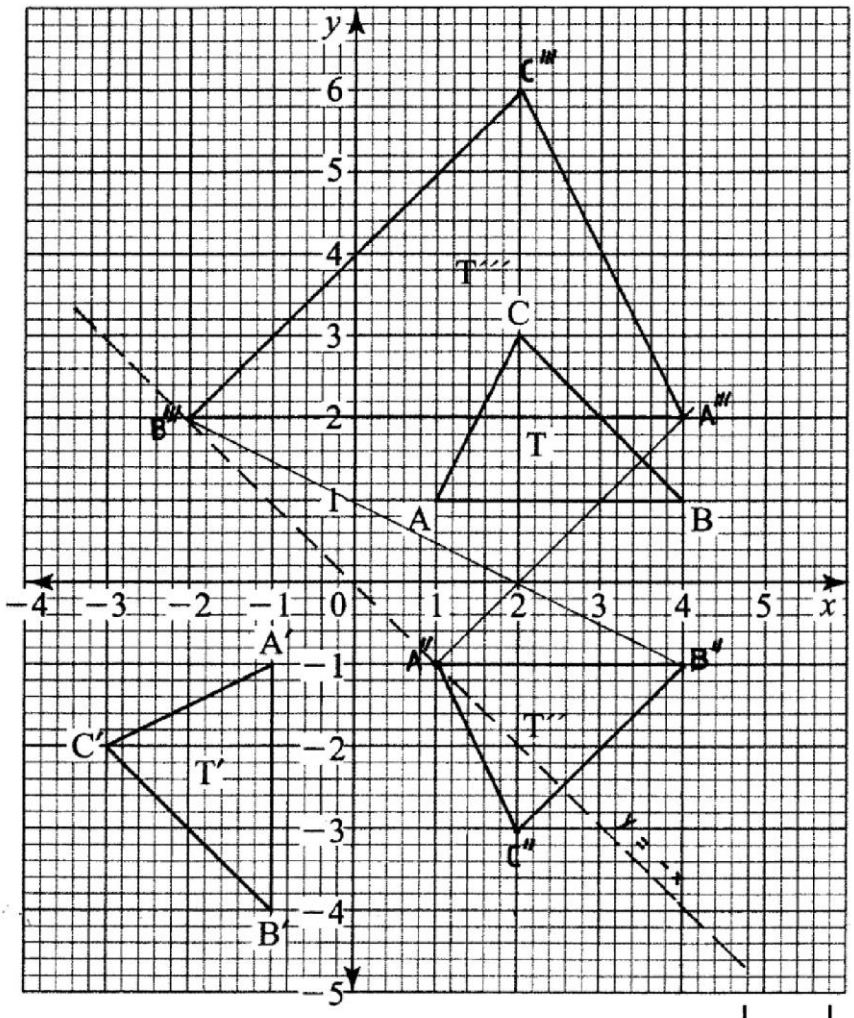


(a)	(i) Construction of 90° at A	B1	
	completion of triangle ABC	B1	
	(ii) Construction of 120°	B1	
	completion of rhombus	B1	
	(iii) Dropping perpendicular from F to BE	B1	
	length of perpendicular = 4.3 ± 0.1 cm	B1	
	(iv) Construction of circle touching sides of rhombus	B1	circle constructed
(b)	area of rhombus outside the circle		
	$2\left(\frac{1}{2}\times 10\times 10\sin 60\right)-\pi\times 4.3^2$	M1	area of rhombus area of circle (radius = 4.3 ± 0.1)
	86.6 - 58.1	M1	Subtraction
	= 28.5 cm^2	A1	
		10	

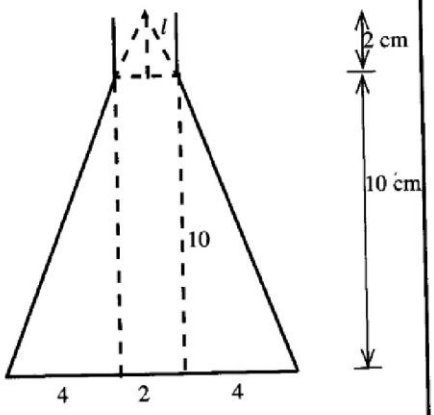
20.	(a) $CD^2 = 12^2 + 15^2 - 2 \times 12 \times 15 \cos 30°$	M1	
	$= 144 + 225 - 311.8$	M1	
	$= 57.2$		
	$CD = \sqrt{57.2} = 7.6$ cm	A1	
	(b) $\frac{AB}{\sin 30} = \frac{15}{\sin 120}$	M1	
	$\Rightarrow AB = \frac{15 \sin 30}{\sin 120}$	M1	
	$= 8.7$ cm	A1	
	(c) $\angle DBC = 60°$, BC = 12 - 8.7 = 3.3 and BD = 8.7		
	$\therefore$ area $= \frac{1}{2} \times 3.3 \times 8.7 \sin 60$	M1	
	$= 12.4$ cm^2	A1	
	(d) angle BDC:		
	$\frac{3.3}{\sin \theta} = \frac{7.6}{\sin 60} \Rightarrow \sin \theta = \frac{3.3 \sin 60}{7.6}$	M1	
	$\theta = 22.1°$	A1	
		10	

21.	(a) At x-axis $y = 0 \Rightarrow x = 1$	M1	
	coordinates of R is (1,0)	A1	
	(b) Gradient of $L_1 = \frac{2}{3}$; Grad $L_2 = \frac{-3}{2}$	B1	
	Equation of L_2: $\frac{y-0}{x-1} = \frac{-3}{2}$	M1	
	$y = -\frac{3}{2}x + 1\frac{1}{2}$	A1	
	(c) (i) Equation L_3: $\frac{y-1}{x+4} = \frac{2}{3}$	M1	
	$3y - 3 = 2x + 8$		
	$\Rightarrow y = \frac{2}{3}x + 3\frac{2}{3}$	A1	
	(ii) $\frac{2}{3}x + 3\frac{2}{3} = \frac{-3}{2}x + \frac{3}{2}$	M1	
	$\frac{2}{3}x + \frac{3}{2}x = \frac{3}{2} - \frac{11}{3}$		
	$13x = -13 = x = -1$		
	subst for y: $y = \frac{2}{3}(-1) + \frac{11}{3}$	M1	
	$= \frac{-2}{3} + \frac{11}{3} = 3$		
	coordinates of S (-1,3)	A1	
		10	

22.	(a) mirror line - y = -x	B1	

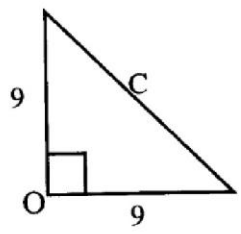


(b) (i)	B1 B1	points A″, B″ and C″ drawing A″ B″ C″
(ii) reflection on line y = 0	B1 B1	
(c)	B1 B1	points A‴, B‴ and C‴ drawing A‴ B‴ C‴
(d) area scale factor $(-2)^2 = 4$	B1	
$\therefore$ area of object $= \frac{12}{4}$	M1	
$= 3\ cm^2$	A1	
	10	

23.	(a) slant height $= \sqrt{4^2+10^2}$ $= 10.8$ (b) slant height of small cone (l) $\frac{l}{1} = \frac{l+10.8}{5}$ $5l = l + 10.8 \Rightarrow l = 2.7$ (c) circular bottom: $3.142 \times 5^2 = 78.6$ cylindrical neck : $3.142 \times 2 \times 2 = 12.6$ conical part: $3.142 \times 5 \times 13.5 - 3.142 \times 1 \times 2.7$ $212.1 - 8.5 = 203.6$ External surface area = $78.6 + 12.6 + 203.6$ $= 294.8$	M1 A1 M1 A1 B1 B1 M1 M1 M1 A1 10	

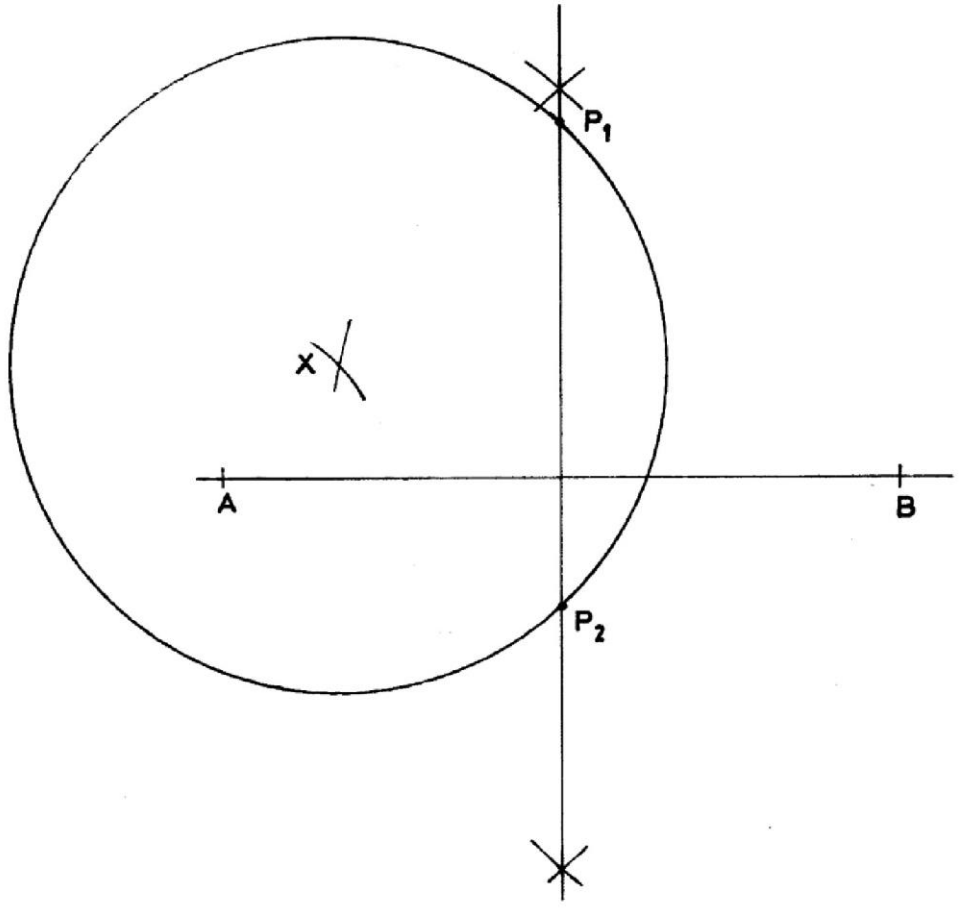
24.	(a) (i) $\frac{dy}{dx} = 6x^2 - 18x + p$	B1	
	$\therefore$ at x = 4 : $\frac{dy}{dx} = 6 \times 16 - 18 \times 4 + p = 36$	M1	
	$96 - 72 + p = 36$		
	$p = 12$	A1	
	(ii) At x = 0.5		
	$\frac{dy}{dx} = 6 \times (0.5)^2 - 18 \times 0.5 + 12$		
	$= 4.5$	B1	
	At x = 0.5		
	$y = 2(0.5)^3 - 9 \times 0.5^2 + 12 \times 0.5 - 1$		
	$= 3$	B1	
	Equation $\frac{y-3}{x-\frac{1}{2}} = \frac{9}{2}$	M1	
	$9\left(x - \frac{1}{2}\right) = 2(y-3)$		
	$9x - \frac{9}{2} = 2y - 6$		
	$2y - 9x = \frac{3}{2}$		
	$4y - 18x = 3$	A1	
	(b) At turning point $\frac{dy}{dx} = 0$	M1	
	i.e $6x^2 - 18x + 12 = 0$		
	$(x - 1)(x - 2) = 0$		
	$x = 1$ or $x = 2$	A1	
	coordinates (1, 4) (2, 3)	B1	
		10	

4.3.2 Mathematics Alternative A Paper 2 (121/2)

1.	Actual area = 60×12 $= 720\ cm^2$ Absolute error $= \frac{1}{2}[(60.5 \times 12.5) - (59.5 \times 11.5)]$ $= 36$ Relative error $= \frac{36}{720}$ $= 0.05$	M1 M1 M1 A1 4	
2.	$\frac{\sqrt{11}}{\sqrt{11}-\sqrt{7}} = \frac{\sqrt{11}(\sqrt{11}+\sqrt{7})}{(\sqrt{11}-\sqrt{7})(\sqrt{11}+\sqrt{7})}$ $= \frac{11+\sqrt{77}}{4}$	M1 A1 2	Rationalizing denominator
3.	$\frac{70}{360} \times 2 \times r \times \frac{22}{7} = 11$ $r = \frac{11 \times 360 \times 7}{2 \times 22 \times 70}$ $= 9$ Length of chord  $C = \sqrt{9^2 + 9^2}$ $= 12.7$	M1 A1 M1 A1 4	Or equivalent

4.	Angle ACD = 180 - (90 + 55) = 35° Angle ACB = 180 - (90 + 35 + 35) = 20°	M1 M1 A1 3	
5.	1 person takes 24 × 11 = 264 h to do $\frac{3}{5}$ of the job. In 1 hour one person does $\frac{1}{264} \times \frac{3}{5} = \frac{3}{1320}$ $\therefore$ 7 persons can do $\frac{3 \times 7}{1320}$ of the job in 1 hour Time 7 persons take to complete $\frac{2}{5}$ of the job = $\frac{2}{5} \times \frac{1320}{21}$ = 25.14 hours	 M1 M1 A1 3	
6.	$(3x + 12)^2 + (x - 4)^2 = 200^2$ $9x^2 + 72x + 144 + x^2 - 8x + 16 = 40000$ $10x^2 + 64x - 39840 = 0$ $(x - 60)(5x + 332) = 0$ $x = 60$ Area = 56 × 192 = 10752 cm^2	M1 M1 A1 B1 4	

7.	$\text{Log}(x - 1) + \log 100 = \log(3x + 2) + \log 25$ $\text{Log } 100(x - 1) = \text{Log } 25(3x + 2)$ $(x - 1)100 = (3x + 2)\,25$ $100x - 100 = 75x + 50$ $25x = 150$ $x = 6$	M1 M1 A1 3	
8.	$(x - y)^5 = x^5 - 5x^4y + 10x^3y^2 - 10x^2y^3 + 5xy^4 - y^5$ $9.8^5 = (10 - 0.2)^5$ $= 10^5 - 5(10)^4 \times 0.2 + 10 \times 10^3 \times 0.2^2 -$ $10 \times 10^2 \times 0.2^3 + 5 \times 10 \times 0.2^4 - 0.2^5$ $= 90392.0797$	B1 M1 A1 3	

9.	Centre of circle $= \left(\frac{-1+5}{2}, \frac{6+-2}{2}\right)$ $= (2,2)$ Radius $= \frac{\sqrt{(-1-5)^2+(6+2)^2}}{2}$ $= \frac{\sqrt{36+64}}{2} = 5$ Equation of circle = $(x - 2)^2 + (y - 2)^2 = 5^2$ $x^2 - 4x + 4 + y^2 - 4y + 4 = 25$ $x^2 + y^2 - 4x - 4y = 17$	M1 M1 M1 A1 4	
10.	 ⊥ar bisector of AB Drawing circle centre x, radius 4 cm Locating P_1 and P_2 ($P_1P_2 = 6 \pm 0.1$ cm)	B1 B1 B1 3	

11.	$\frac{3}{8}\times\frac{5}{7}+\frac{5}{7}\times\frac{3}{7}$ $= \frac{15}{28}$	M1 A1 2	
12.	$m+b \geq 32$ $m > 20$ $b \geq 6$ $2500\,m + 3500\,b \leq 100000$ $5m + 7b \leq 200$	B1 B1 B1 B1 4	
13.	$\int_2^4 (x^2+2x-15)dx = \left[\frac{x^3}{3}+\frac{2x^2}{2}-15x\right]_2^4$ $= \left[\frac{4^3}{3}+4^2-15(4)\right]-\left[\frac{2^3}{3}+2^2-15(2)\right]$ $= -22\frac{2}{3} - -23\frac{1}{3}$ $= \frac{2}{3}$	M1 M1 A1 3	

14.	Longitude difference = 71 - 36 = 35° Distance in nautical miles $= 35 \times 60 \cos 45°$ = 1484.9 nm	B1 M1 A1 3	
15.	$\sin\left(\frac{1}{2}x - 30\right) = \sin(90 - x)$ $\frac{1}{2}x - 30 = 90 - x$ x = 80°	 M1 A1 2	
16.	$\mathbf{PQ} = \begin{pmatrix} 3 \\ -6 \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 5 \\ -5 \end{pmatrix}$ $\mathbf{QR} = \begin{pmatrix} 4 \\ -1 \end{pmatrix} - \begin{pmatrix} 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$ $\mathbf{PQ} = \frac{5}{2}\ \mathbf{QR}$ and Q is a common point $\therefore$ P, Q and R are collinear	B1 B1 B1 3	

17.	(a) (i) $6400 + 1750 \times 20$	M1	
	$= \text{Ksh } 41\,400$	A1	
	(ii) $41\,400 - 36\,000 = \text{Ksh } 5400$	B1	
	(b) $36000\left(1+\frac{r}{100}\right)^{\frac{20}{12}} = 41\,400$	M1	
	$\left(1+\frac{r}{100}\right)^{\frac{5}{3}} = 1.15$	M1	
	$\left(1+\frac{r}{100}\right) = 1.15^{\frac{3}{5}}$		
	$\frac{r}{100} = 0.087473554$	M1	
	$r = 8.7473554$		
	$\approx 8.7\%$	A1	
	(c) 36000×1.087^2	M1	
	$= 42536.484$	A1	
	$42536.484 - 36000$		
	$= 6536.484 \approx \text{Ksh } 6536$	B1	
		10	

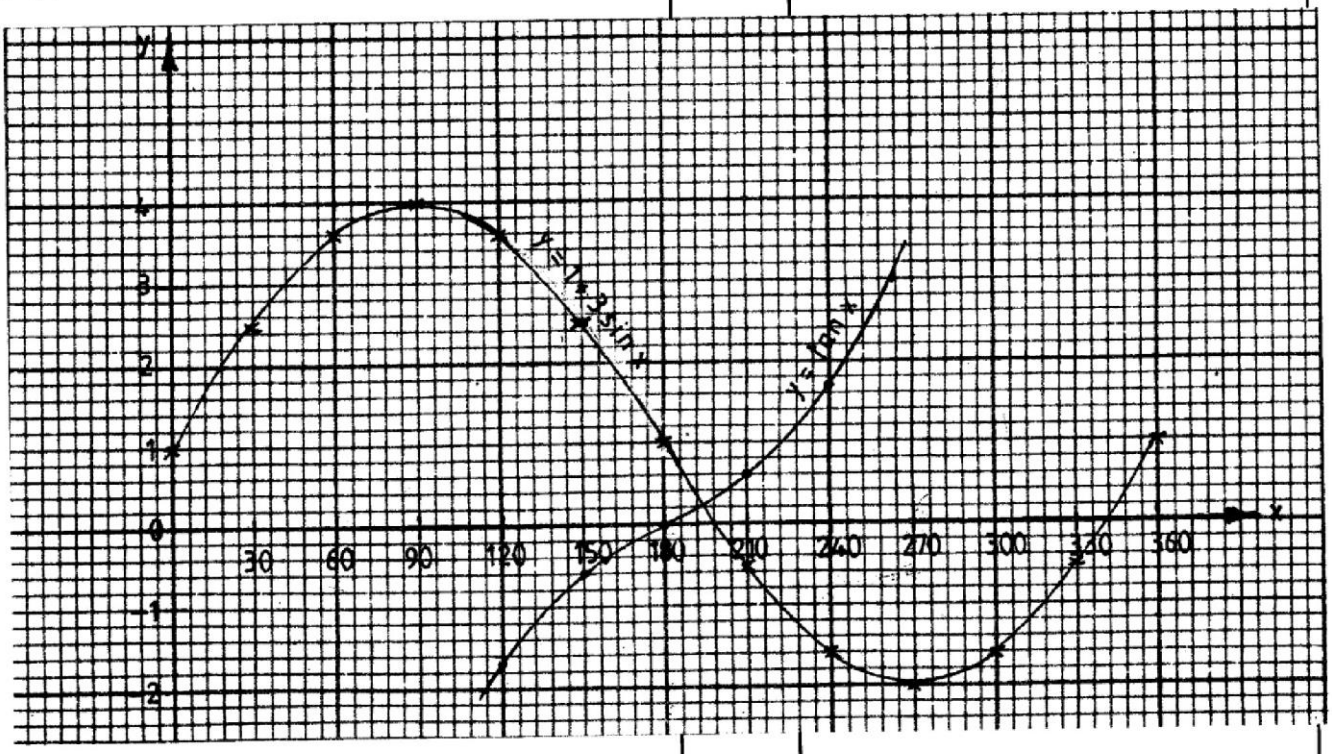
18.	(a) (i) $40 + (10 - 1)(-3)$	M1	
	$= 40 - 27 = 13$ km	A1	
	(ii) First term after 10 days		
	$= 13 - 2 = 11$	B1	
	16^{th} day: $11 + 5 \times -2$	M1	
	$= 1$ km	A1	
	(b) $S_{10} = \frac{10}{2}(2 \times 40 + 9 \times -3)$	M1	
	$= 5(80 - 27) = 265$		
	$S_6 = \frac{6}{2}(2 \times 11 + 5 \times -2)$	M1	
	$= 3(22 - 10) = 36$		
	Total distance travelled		
	$= 265 + 36 = 301$	A1	
	Amount of money raised		
	$=$ Ksh 301×200	M1	
	$=$ Ksh 60 200	A1	
		10	

19. (a)

$x°$	0°	30°	60°	90°	120°	150°	180°	210°	240°	270°	300°	330°	360°
$y = 1 + 3\sin x$	1	2.5	3.6	4	3.6	2.5	1	-0.5	-1.6	-2	-1.6	-0.5	1

B2 Allow B1 for at least 5 √

(b) (i)



S1
P1
C1

(ii) Amplitude of curve = 3

B1

(c) tan x values

x	90	120	150	180	210	240	270
tan x		-1.7	-0.6	0	0.6	1.7	

B1

Plotting $y = \tan x$

P1

tan x curve

C1

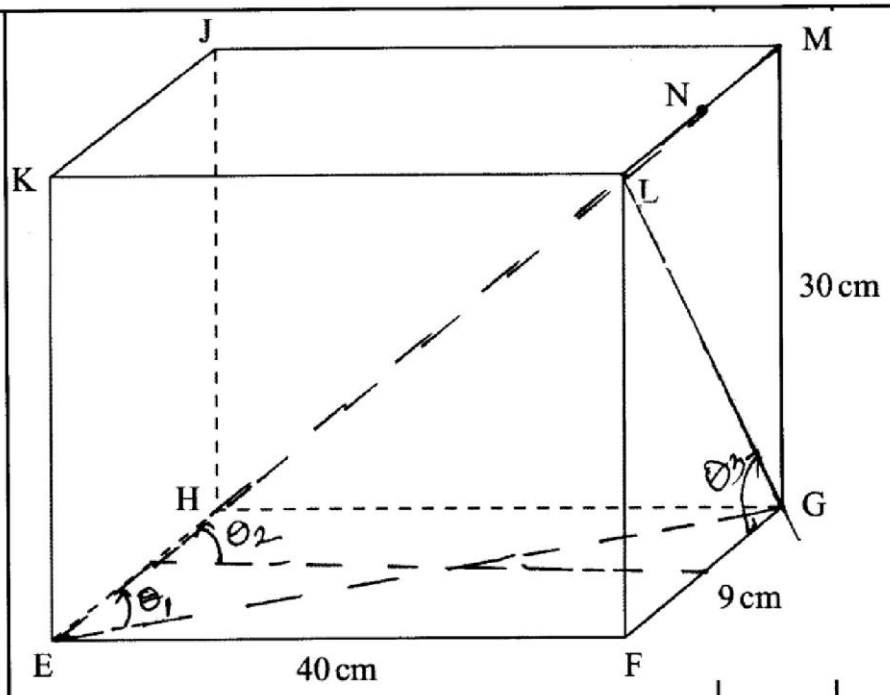
(d) $1 + 3 \sin x = \tan x$

$x = 195°$

B1

10

20.



(a) Length GL $= \sqrt{30^2 + 9^2} = 31.32$	B1
(b) Length FJ $= \sqrt{41^2 + 900}$	M1
$= 50.80$	A1
(c) angle between EM and plane EFGH	
$EG = \sqrt{40^2 + 9^2} = 41$	B1
$\theta_1 = \tan^{-1}\frac{30}{41}$	M1
$= 36.19°$	A1
(d) angle between the plane EFGH and ENH	
$\theta_2 = \tan^{-1}\frac{30}{40}$	M1
$= 36.87°$	A1
(e) angle between lines EH and plane GL	
= angle between lines FG and GL	
$\theta_3 = \tan^{-1}\frac{30}{9}$	M1
$= 73.30°$	A1
	10

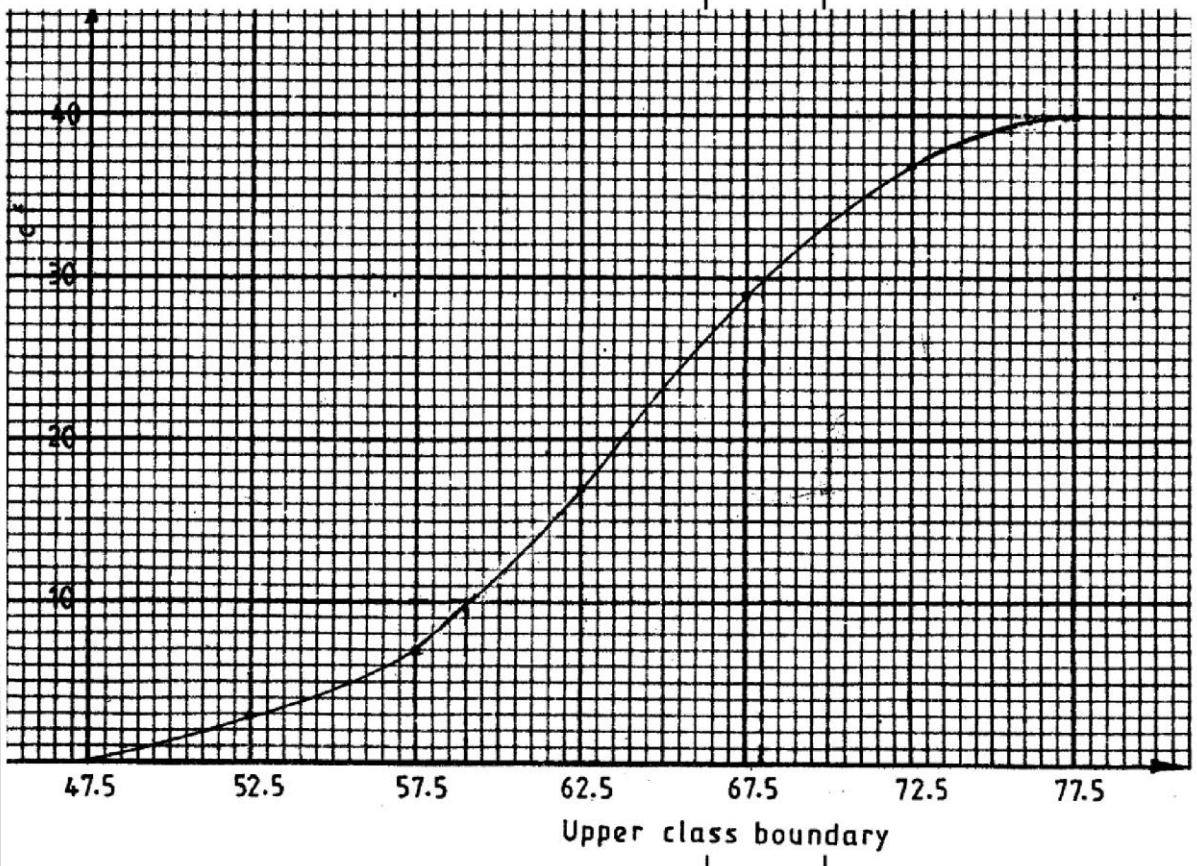
21.	(a) (i) $P = k_1m^2 + k_2n$	B1	
	$4k_1 + -3k_2 = 3.8$		
	$9k_1 + 2k_2 = -0.2$		
	$8k_1 - 6k_2 = 7.6$		
	$27k_1 + 6k_2 = -0.6$	M1	Attempt to solve
	$35k_1 = 7.0$		
	$k_1 = 0.2$ $k_2 = -1$	A1	
	$\therefore P = 0.2m^2 - n$	B1	
	(ii) $P = 0.2 \times 10^2 - 4 = 16$	B1	
	(b) $0.2\,m^2 = P + n$	M1	
	$m = \sqrt{\frac{P+n}{0.2}}$	A1	
	(c) New $m = \sqrt{\frac{1.1(P+n)}{0.2}}$	M1	
	% increase in $m = \frac{(\sqrt{1.1}-1)\sqrt{\frac{P+n}{0.2}}}{\sqrt{\frac{P+n}{0.2}}} \times 100$	M1	
	$= 4.88\%$	A1	
		10	

22.	(a) V in terms of t		
	$a = \frac{dV}{dt} = 9 - 3t \Rightarrow V = \int (9 - 3t)\, dt$	B1	
	$V = 9t - \frac{3t^2}{2} + C$	M1	
	when $t = 0, V = 7 \Rightarrow C = 7$	M1	
	$\therefore \quad V = 9t - \frac{3t^2}{2} + 7$	A1	
	(b) maximum velocity		
	$\Rightarrow a = 9 - 3t = 0 \Rightarrow t = 3$	B1	
	$\therefore V = 9 \times 3 - \frac{3 \times 9}{2} + 7$	M1	
	$= 27 - \frac{27}{2} + 7$		
	$= 34 - 13.5$		
	$= 20.5 \text{ ms}^{-1}$	A1	
	(c) $S = \int_0^3 \left(9t - \frac{3}{2}t^2 + 7\right) dt$		
	$\left[\frac{9t^2}{2} - \frac{3t^3}{6} + 7t\right]_0^3$	M1	
	$\left[\frac{81}{2} - \frac{3 \times 27}{6} + 21\right] - [0]$	M1	
	$= 27 + 21$		
	$= 48 \text{ m}$	A1	
		10	

23.	(a) Lower class boundary of modal class 62.5	B1	
	(b) Mean mark: $\Sigma fd = -42 + -36 + -40 + 12 + 48 + 33$ $= -25$ $\therefore$ mean $= 64 - \frac{25}{40}$ $= 63.375$	M1 M1 A1	
	(c) (i)		

Cummulative frequency	3	7	17	29	37	40
Upper class boundary	52.5	57.5	62.5	67.5	72.5	77.5

B1 for c.f



P1 √ plotting
C1 √ curve

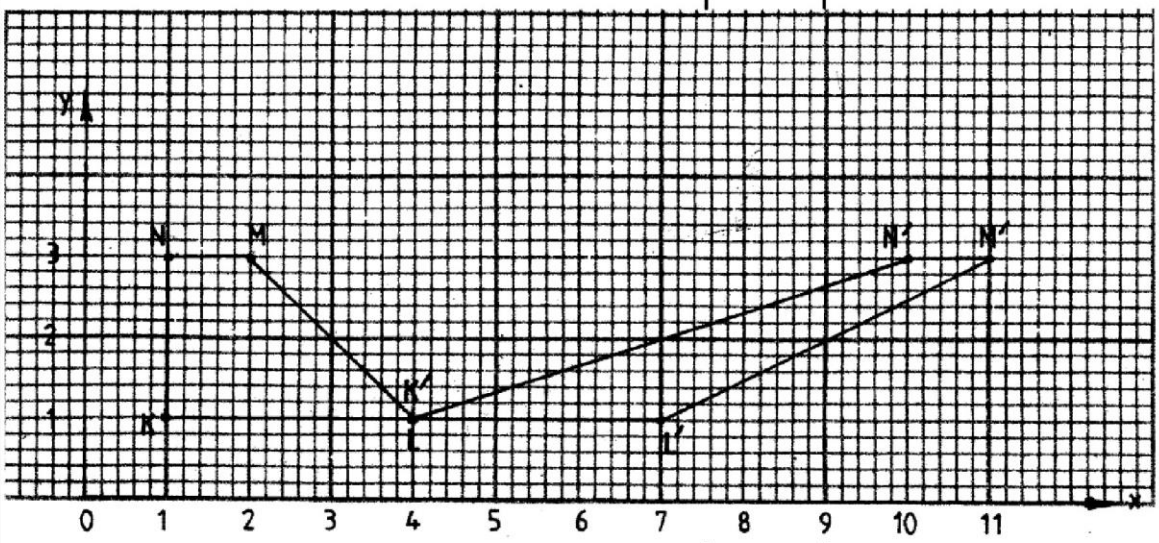
(ii) $Q_3 = 68 \pm 0.5$ $Q_1 = 59 \pm 0.5$ B1

Semi-interquartile range

$= \frac{68 - 59}{2}$ M1

$= 4.5$ A1

		10	

24.	(a) $\begin{matrix} & K & L & M & N \end{matrix}$ $\begin{pmatrix} 1 & 3 \\ 0 & 1 \end{pmatrix}\begin{pmatrix} 1 & 4 & 2 & 1 \\ 1 & 1 & 3 & 3 \end{pmatrix} = \begin{matrix} K' & L' & M' & N' \end{matrix}$ $\begin{pmatrix} 4 & 7 & 11 & 10 \\ 1 & 1 & 3 & 3 \end{pmatrix}$	M1 A1	
	coordinates $K'(4,1), L'(7,1), M'(11,3), N'(10,3)$	B1	
			
		B1 B1	√ object KLMN √ image K'L'M'N'
	(c) (i) shear with x axis (y = 0) invariant	B1	
	and point N(1,3), mapped onto N'(10,3)	B1	any other point and its image may be used
	(ii) area of image $= \left(\frac{3+1}{2}\right) \times 2 = 4$	B1	
	(d) $T^{-1} = \frac{1}{1}\begin{pmatrix} 1 & -3 \\ 0 & 1 \end{pmatrix}$	M1	
	$= \begin{pmatrix} 1 & -3 \\ 0 & 1 \end{pmatrix}$	A1	
		10	