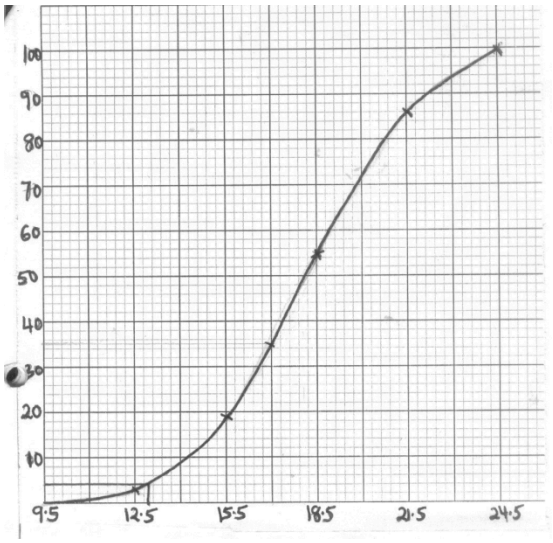
FORM 4 MATHS MARKING SCHEME

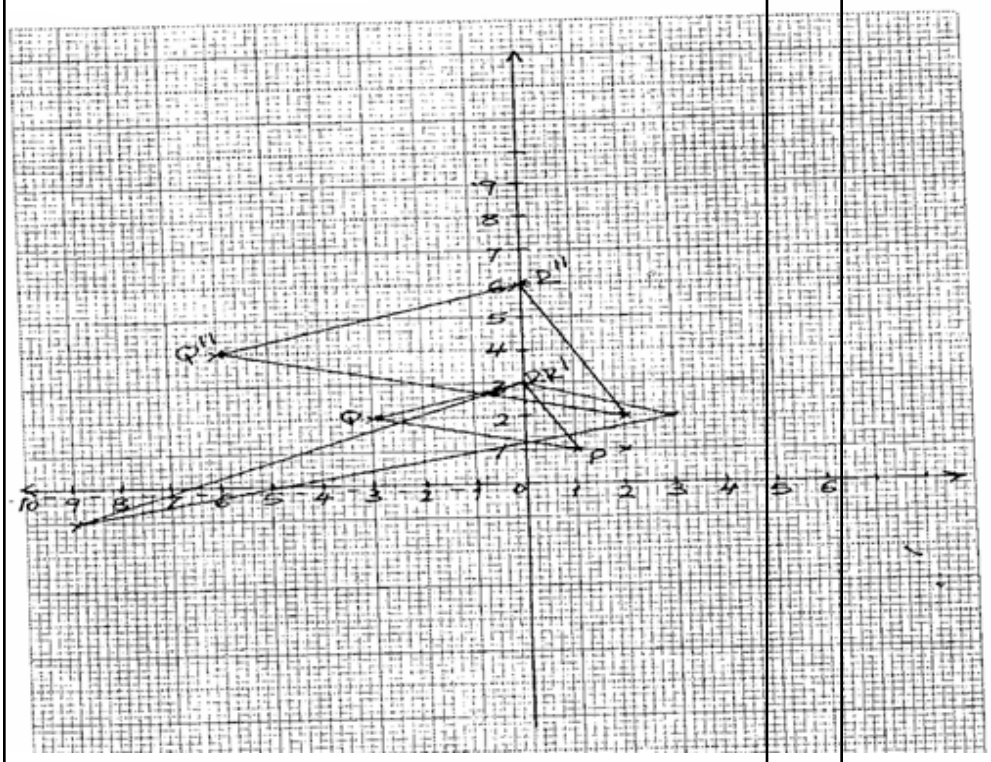
1.	No Log 0.7841 $\bar{1}.8944$ $0.1356^{½}$ $\frac{\bar{1}.1323}{2} = \bar{1}.5662$ Log 84.92 = 1.929 $\frac{0.2853}{\bar{1}.1753}$ $\frac{\bar{3}}{3} + \frac{2.1753}{3} = \bar{1}.7251$ 0.5310 $\bar{1}.7251$	M 1 M 1 M 1 A1	✓ logs ✓ oper
2.	3. Difference in longitude = $10 + 35 = 45^0$ $\therefore legnth\ of\ Arc\ AB = \frac{45}{360} \times 2 \times \pi \times 0.5$ $= \frac{1}{8}\pi = 0.125\pi$	M 1 M 1 A1	
3.	a) $\frac{2+a}{2} = -2 \Rightarrow 2 + a = -4$ $a = -6$ $\frac{3+b}{2} = -2.5 \Rightarrow 3 + b = -5$ $b = -8$	B1	
	b) $\therefore$(a, b) = (-6,8)	M 1 M 1	

	$r = \sqrt{(2--6)^2 + (3--8)^2} = \sqrt{185}$ $\therefore (x-2)^2 + (y-3)^2 = 185$ $x^2 - 4x + 4 + y^2 - 6y + 9 = 185$ $x^2 + y^2 - 4x - 6y - 172 = 0$	A1	
4.	$\mathbf{x = y + \sqrt{x^2 + a^2}}$ $x - y = \sqrt{x^2 + a^2}$ $(x - y)^2\ x^2 + a^2$ $(x - y)^2\ x^2 = a^2$ $\pm \sqrt{(x - y + x)(x - y - x)} = a$ $\pm \sqrt{(2x - y)(-y)} = a$ $\pm \sqrt{(y^2 - 2xy)} = a$		
5.	$\left(\frac{2}{3}x + 20\right) + \frac{5}{6}x + 10^0 = 90$ $\frac{9}{6}x + 30 = 90$ $\frac{9}{6}x = 60^0$ $X = 40^0$ $=\text{Tan}\ (x + 20)$ $=\text{Tan}\ 60$	M 1 A1 B1	

6.	**CUBE** | 1 2 3 4 5 6 1 | 2 3 4 5 6 7 2 | 3 4 5 6 7 8 3 | 4 5 6 7 8 9 4 | 5 6 7 8 9 10 a) i) P(6) = $\frac{4}{24}$ = $\frac{1}{6}$ ii) P(6 or 9) = $\frac{1}{4}$ P(6) = $\frac{4}{24}$ P(9) = $\frac{2}{24}$ $\frac{4}{24}$ + $\frac{2}{24}$ $\frac{6}{24}$ = $\frac{1}{4}$	B1 B1 B1 B1	
7.	(a) s = $8^3 - 5 \times 8^2 + 3 \times 8 + 4$ 512 – 320 + 24 + 4 = 220m (b) V = $\frac{ds}{dt}$ = $3t^2 - 10t + 3$ = $3 \times 10^2 - 10 \times 10 + 3$ 300 – 100 +3 = 197m		

8.	$(x + 2)(x - 5) = 60$ $x^2 - 5x + 2x - 10 = 60$ $x^2 - 3x - 70 = 0$ $x^2 - 10x + 7x - 70 = 0$ $x(x - 10) + 7(x - 10) = 0$ $(x - 10)(x + 7) = 0$ $x = 10$ $x = -7$ Length $10 + 2 = 12$m	M1 M1 A1	
7.	Upper class limits 12.5, 15.5, 18.5, 21.5 24.5 Cumulative frequency 3, 19 55, 86,100  b) i) Median = 50th 18.2 ± 0.15 ii) Leaves below 13 =4 leaves leaves below 17 =35 leaves leaves between 13 and 17 = 35-4=31	B1 B1 S1 P1 C1 B1 B1 B1 M1 A1	May be implied.

8.



9. (b) (b)

$$\begin{pmatrix} 3 & 0 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} P & Q & R \\ 1 & -3 & 0 \\ 1 & 2 & 3 \end{pmatrix} = \begin{pmatrix} P^1 & Q^1 & R^1 \\ 3 & -9 & 0 \\ 2 & -1 & 3 \end{pmatrix}$$

(c)

$$\begin{pmatrix} \frac{2}{3} & 0 \\ \frac{-2}{3} & 2 \end{pmatrix}\begin{pmatrix} 3 & -9 & 0 \\ 2 & -1 & 3 \end{pmatrix} = \begin{pmatrix} P^{11} & Q^{11} & R^{11} \\ 2 & -6 & 0 \\ 2 & 4 & 6 \end{pmatrix}$$

Coordinates

P^{11} (2, 2) Q^1(-6,4) R^{11} (0,6)

(d) It an enlargement centre origin (0, 0) scale factor 2

$$\begin{pmatrix} \frac{2}{3} & 0 \\ \frac{-2}{3} & 2 \end{pmatrix}\begin{pmatrix} 3 & 0 \\ 1 & 1 \end{pmatrix} = \begin{pmatrix} 2 & 0 \\ 2 & 2 \end{pmatrix}$$

B1

for triangles