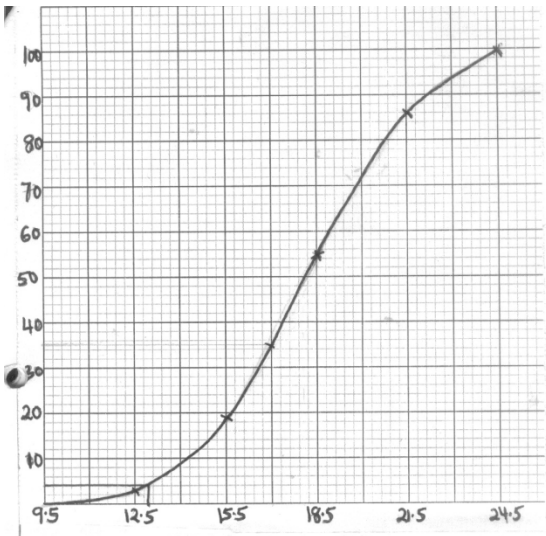


### FORM 4 MATHS MARKING SCHEME

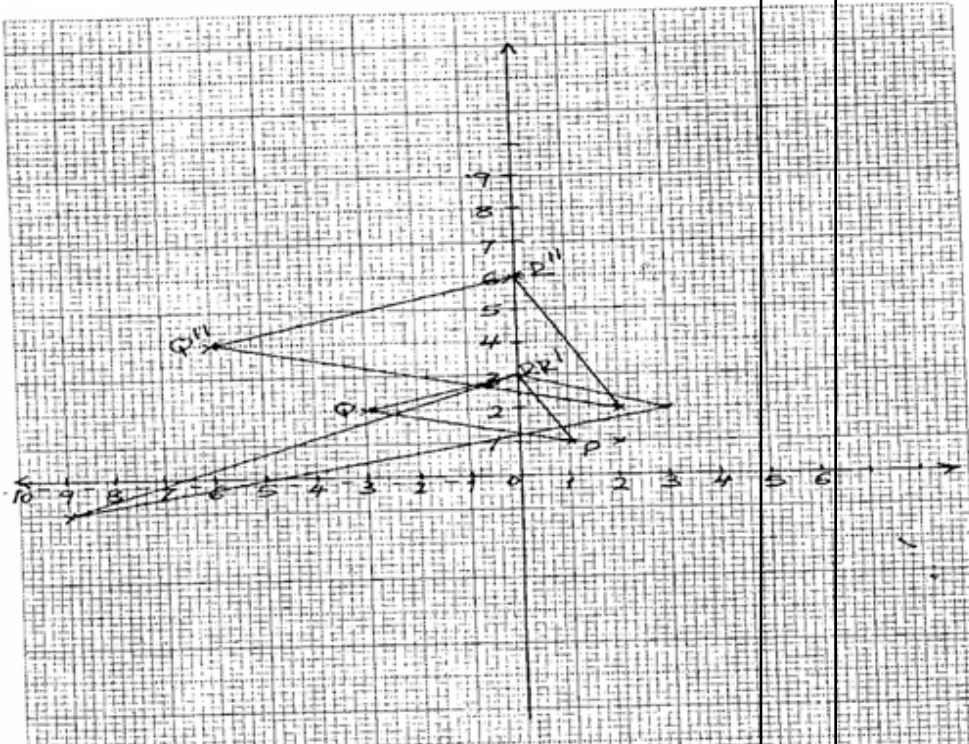
|    |                                                                                                                                                                                                                                                                                                                                                                                                |                                                                       |                             |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------|
| 1. | <p>No</p> <p>0.7841</p> <p>0.1356<sup>1/2</sup></p> <p>Log 84.92 = 1.929</p> <p>0.5310</p> <p style="text-align: center;">Log</p> <p style="text-align: center;">1.8944</p> $\frac{1.1323}{2} = \frac{1.5662}{1.4606}$ <p style="text-align: center;">0.2853</p> <p style="text-align: center;">1.1753</p> $\frac{3}{3} + \frac{2.1753}{3} = 1.7251$ <p style="text-align: center;">1.7251</p> | <p>M<br/>1</p> <p>M<br/>1</p> <p>M<br/>1</p> <p>M<br/>1</p> <p>A1</p> | <p>✓ logs</p> <p>✓ oper</p> |
| 2. | <p>3. Difference in longitude = 10 + 35 = 45°</p> <p>∴ length of Arc AB = <math>\frac{45}{360} \times 2 \times \pi \times 0.5</math></p> <p><math>= \frac{1}{8} \pi = 0.125\pi</math></p>                                                                                                                                                                                                      | <p>M<br/>1</p> <p>M<br/>1</p> <p>A1</p>                               |                             |
| 3. | <p>a)</p> $\frac{2+a}{2} = -2 \Rightarrow 2+a = -4$ <p><math>a = -6</math></p> $\frac{3+b}{2} = -2.5 \Rightarrow 3+b = -5$ <p><math>b = -8</math></p>                                                                                                                                                                                                                                          | <p>B1</p>                                                             |                             |
|    | <p>b) ∴ (a, b) = (-6, 8)</p>                                                                                                                                                                                                                                                                                                                                                                   | <p>M<br/>1</p> <p>M<br/>1</p>                                         |                             |

|    |                                                                                                                                                                                                               |                            |  |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|--|
|    | $r = \sqrt{(2 - -6)^2 + (3 - -8)^2} = \sqrt{185}$ $\therefore (x - 2)^2 + (y - 3)^2 = 185$ $x^2 - 4x + 4 + y^2 - 6y + 9 = 185$ $x^2 + y^2 - 4x - 6y - 172 = 0$                                                | 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<br>1<br><br>A1<br><br>B1 |  |
|    |                                                                                                                                                                                                               |                            |  |

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |                                                         |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---------------------------------------------------------|
| 6. | <div><div><div>CUBE</div><table><tr><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table></div><div>a) i) <math>P(6) = \frac{4}{24} = \frac{1}{6}</math><br/>ii) <math>P(6 \text{ or } 9) = \frac{1}{4}</math><br/><math>P(6) = \frac{4}{24}</math><br/><math>P(9) = \frac{2}{24}</math><br/><math>\frac{4}{24} + \frac{2}{24}</math><br/><math>\frac{6}{24} = \frac{1}{4}</math></div></div> |   | 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 | <div>B1</div> <div>B1</div> <div>B1</div> <div>B1</div> |
|    | 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 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |                                                         |
| 7. | <div>(a) <math>s = 8^3 - 5 \times 8^2 + 3 \times 8 + 4</math><br/><math>512 - 320 + 24 + 4</math><br/><math>= 220\text{m}</math></div> <div>(b) <math>V = \frac{ds}{dt} = 3t^2 - 10t + 3</math><br/><math>= 3 \times 10^2 - 10 \times 10 + 3</math><br/><br/><math>300 - 100 + 3</math><br/><math>= 197\text{m}</math></div>                                                                                                                                                                                                                                                                                                                                                                                                                            |   |   |   |   |    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |    |                                                         |

|    |                                                                                                                                                                                                                                                                                                                                         |                                                                                      |                 |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------|
| 8. | $(x + 2)(x - 5) = 60$ $x^2 - 5x + 2x - 10 = 60$ $x^2 - 3x - 70 = 0$ $x^2 - 10x + 7x - 70 = 0$ $x(x - 10) + 7(x - 10) = 0$ $(x - 10)(x + 7) = 0$ $x = 10$ $x = -7$ $\text{Length } 10 + 2 = 12\text{m}$                                                                                                                                  | M<br>1<br><br><br><br><br><br><br>M<br>1                                             |                 |
| 7. | <p>Upper class limits 12.5, 15.5, 18.5, 21.5 24.5<br/>Cumulative frequency 3, 19 55, 86,100</p>  <p>b) i) Median = 50th 18.2 ± 0.15<br/>ii) Leaves below 13 = 4 leaves<br/>leaves below 17 = 35 leaves<br/>leaves between 13 and 17 = 35 - 4 = 31</p> | B1<br><br>B1<br><br><br>S1<br>P1<br><br>C1<br><br><br>B1<br>B1<br>B1<br>M<br>1<br>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

