


| Question |     | Answer   | Marks | Part marks and guidance  |  |
|----------|-----|--|-------|--|--|
| 1        | (a) | Octagon  | 1     |  | Condone poor spelling<br>Ignore embellishments   |
|          | (b) | 12   | 1     |  |  |
| 2        | (a) | 3  | 1     |  |  |
|          | (b) | 10   | 2     | B1 for only 2 and 12 identified  |  |
| 3        | (a) | 110  | 1     |  | In both parts, if answer line blank<br>may be in correct place on<br>diagram   |
|          | (b) | 70   | 1     |  |  |
| 4        |     | No, they need 9 boxes oe<br>with correct working   | 2     | M1 for $590 \div 73$ , $590 \div 8$ or $73 \times 8$<br><br>If 0 scored, SC1 for 8.08[2...], 8.1,<br>73.7[5], 73.8, 584 or 6 | Correct working requires M1<br><br>Allow M1 for repeated<br>addition/subtraction if method<br>shown. If only numbers listed<br>addition must reach 584,<br>subtraction must reach 6<br><br>See Exemplars |
| 5        |     | 2 correct from e.g.<br>Bars are unequal width<br>Vertical scale is not linear<br>Vertical axis does not start at 0 | 2     | B1 for each  | Both marks may be scored in one<br>sentence<br><br>See Exemplars   |
| 6        | (a) | 8  | 1     |  |  |
|          | (b) | 23 or 83   | 1     |  | Accept both but no extras  |

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|----------|--|-------|--|
| (c)      | 283  | 1     |  |
| 7 (a)    | $2t$ final answer                                | 1     | Accept $2 \times t$<br>Condone $t2$  |
| (b)      | $x(x + 2)$ final answer                          | 1     | Accept e.g. $1x(x + 2)$ ,<br>$(x + 0)(x + 2)$<br><br>Condone final bracket missing   |
| 8        | 0.5209 52.9[%] $\frac{9}{17}$ $\frac{530}{1000}$ | 2     | <b>B1</b> for 3 in the correct order<br>or<br><b>M1</b> for correct conversion of all values<br>into a comparable form<br>e.g 0.529 0.53 0.5294 0.5209 oe  |
| 9        | 54   | 3     | <b>M2</b> for $36 \div 2 \times 3$ oe or $36 + 18$<br>or<br><b>M1</b> for $36 \div 2$ oe may be soi by 18<br><br>OR<br>breakdown method<br><b>B2</b> for 36 associated with $\frac{2}{3}$ and<br>18 associated with $\frac{1}{3}$<br><br>or<br><b>B1</b> for 36 associated with $\frac{2}{3}$ or<br>18 associated with $\frac{1}{3}$ |
| 10       | 62.5 or $62\frac{1}{2}$ or $\frac{125}{2}$       | 2     | <b>B1</b> for 3906.25 or $3906\frac{1}{4}$ or $\frac{15625}{4}$  |

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|----------|-----|--|-------|---|---|
| 11       | (a) | 75<br>11<br>45<br>19   | 4     | <b>B1</b> each correct<br>OR<br><b>B1</b> for 75<br><b>B1 FT</b> for 45<br><b>B1 FT</b> for 11 and 19                         | Mark to candidate's advantage, ie<br><b>B1</b> each correct or part marks including possible <b>FT</b><br><br>Negative numbers will not score.<br>Values must be integers.  |
|          | (b) | $64 + 26 = 90$ and $\frac{90}{120} = 75\%$ nfw<br>OR<br>$120 \times 0.75 = 90$ and $64 + 26 = 90$ oe | 2     | <b>M1</b> for $64 + 26 = 90$<br>OR<br><b>M1</b> for $120 \times 0.75 = 90$<br>OR<br><b>M1</b> for $\frac{90}{120} = 75\%$ nfw | Accept $\frac{3}{4}$ for 75%<br><br>Allow equivalent methods using 25% or $\frac{1}{4}$ for <b>M1</b> or <b>2</b><br>If using 25% for <b>2</b> marks they must also show $100\% - 25\% = 75\%$ oe<br><br>Breakdown methods must be complete and correct<br><br>Do not accept e.g. 0.75 of 120<br>Do not accept e.g. 75% $\times$ 120<br>Do not accept 75% for 0.75 or $\frac{75}{100}$<br>as this is a show that question |

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|----------|-----|-------------------|-------|--|
| 12       |     | 131.7[...] or 132 | 4     | <p><b>M1</b> for [rectangle] <math>16 \times 10</math> soi 160</p> <p><b>M1</b> for [circle] <math>\pi \times 3^2</math> oe soi 28.2 to 28.3</p> <p><b>M1</b> for <i>their</i> rectangle area – <i>their</i> circle area</p> <p>If <b>0</b> or <b>1</b> scored, instead award <b>SC2</b> answer 46.9[...]</p> <p>Method for rectangle and circle areas spoilt by additional steps in initial area calculations e.g.<br/><b>M0</b> for <math>16 \times 10 \times 2</math></p> <p>Do not lose <b>M1</b> for [rectangle] or <b>M1</b> for [circle] if further work does not include these, provided it is not contradicted by further method</p> <p><i>Their</i> circle area should be from <math>\pi \times 3^2</math> or <math>\pi \times 6^2</math> eg soi by 113.[...] <b>not</b> <math>2\pi r</math></p> |
| 13       | (a) | 36                | 4     | <p><b>M3</b> for <math>(2 \times 22 + 4 \times 18) - 80</math> oe or</p> <p><b>M2</b> for <math>2 \times 22 + 4 \times 18</math> may be implied by <math>44 + 72</math> or 116</p> <p>or</p> <p><b>M1</b> for <math>2 \times 22</math> or <math>4 \times 18</math> may be implied by 44 or 72</p>  |
|          | (b) | 52.7[0]           | 4     | <p><b>M3</b> for <math>0.85 \times (2 \times 22 + 18)</math> oe soi by <math>0.85 \times 62</math></p> <p>or</p> <p><b>M2</b> for <math>0.85 \times</math> <i>their</i> price oe may be done in stages, soi by 15.3[0], 18.7[0], 34[.00], 37.4[0], or 68[.00]</p> <p>or <math>0.15 \times (2 \times 22 + 18)</math> oe soi by <math>0.15 \times 62</math> or 9.3[0]</p> <p>or <b>M1</b> for <math>0.15 \times</math> <i>their</i> price oe may be done in stages, soi by 2.7[0], 3.3[0], 6[.00], 6.6[0], or 12[.00]</p> <p>oe includes reducing individual prices before summing</p> <p><i>their</i> price must be 18, 22, <math>18+22</math> or 40, <math>22+22</math> or 44, or 80</p> <p>If done in stages, award <b>M2</b> or <b>M1</b> if at least one correct calculation</p>                        |

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|----------|-----|--|-------|--|---|
| 14       | (a) | 3  | 2     | M1 for $(150 - 90) \div 20$  | Condone $150 - 90 \div 20$ for M1   |
|          | (b) | [0]9:45 [am]<br>with correct working                             | 5     | <p>M1 for <math>6 \times 20 + 90</math> oe<br/>A1 for 210</p> <p>M1 for <i>their</i> 210 correctly converted into hrs and mins or decimal hours soi by 3 h 30 m or 3.5 [h]</p> <p>M1 for 1:15 – <i>their</i> time</p> <p>If 0, 1 or 2 scored, instead award SC3 for answer 9:45[am] with no working or insufficient working</p> <p>If 0 or 1 scored, instead award SC2 for 3 h 30 m or 3.5 [h] with no working or insufficient working</p> <p>If 0 scored, SC1 for 210 with no working or insufficient working</p> | <p>“correct working” requires evidence of at least M1 M1</p> <p>Provided <i>their</i> 210 is not a multiple of 60<br/>Do not accept 3.3 hours as a correct conversion from 3 h 30 m, but condone 3.3 used in the next step</p> <p><i>Their</i> time may be in whole hours, minutes, hrs and mins or decimal hours</p> |
| 15       | (a) | $\begin{pmatrix} -5 \\ 2 \end{pmatrix}$                          | 2     | <p>B1 each value<br/>or<br/>SC1 for <math>\begin{pmatrix} -5 \\ 2 \end{pmatrix}</math> or <math>\begin{pmatrix} 2 \\ -5 \end{pmatrix}</math></p>   | Do not accept coordinates   |
|          | (b) | $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$ drawn with correct arrow | 1     |  |   |
| 16       |     | 100  | 3     | <p>M2 for <math>150 \div 3 \times 2</math><br/>or M1 for <math>150 \div 3</math> soi 50 nfw</p>  |   |

| Question | Answer  | Marks | Part marks and guidance  |
|----------|---|-------|--|
| 17       | <p><math>x \geq 3</math></p> <p>AND</p>  | 4     | <p><b>B2</b> for <math>x \geq 3</math><br/>or <b>M1</b> for <math>2x \geq 11 - 5</math> or better<br/>or <math>x + 2.5 \geq 5.5</math> or better</p> <p>AND</p> <p><b>B2FT</b> for <i>their</i> inequality correctly shown<br/>or <b>B1FT</b> for correctly placed circle for <i>their</i> <math>x \geq 3</math> but with hollow circle and correct arrow or for filled circle with incorrect arrow</p> <p><u>Solution to inequality</u></p> <p>Allow <b>M1</b> for this expression with other inequality symbols or equals sign or <math>[x =] 3</math> as solution (can be implied by mark/circle on the diagram)<br/>or trials leading to selection of 3 or final correct trial using 3</p> <p><u>Displaying the solution:</u></p> <p>Display must show an inequality that fits on the number line for FT<br/>Mark to candidate's advantage either <math>x \geq 3</math> or <i>their</i> inequality</p> <p>Accept an arrow of any length or a line reaching 9</p> <p><u>If no solution to inequality seen:</u><br/>Filled circle at 3 arrow to right <b>M1B2</b><br/>Filled circle at 3 arrow to left <b>M1B1</b><br/>Hollow circle at 3 arrow to right <b>M1B1</b><br/>Hollow circle at 3 arrow to left <b>M1B0</b><br/>Mark at 3 no line or arrow <b>M1B0</b><br/>Circle and/or arrow at other than 3 <b>M0B0</b></p> |

| Question |     | Answer             | Marks | Part marks and guidance  |   |
|----------|-----|--------------------|-------|--|---|
| 18       | (a) | $6.05 \times 10^6$ | 1     |  | Condone extra zeros and notation such as $6.05 \times 10^{06}$ and $6.05 .10^6$ but not $6.05^{\times 10^6}$ or $6.05^{06}$ |
|          | (b) | [0].00458          | 1     |  | Condone extra zeros   |
| 19       |     | 180                | 3     | <p><b>M2</b> for <math>149.4 \div 0.83</math> <b>oe</b></p> <p>or</p> <p><b>B1</b> for 0.83 <b>oe</b> seen [in working towards their answer]</p> <p>or</p> <p>for 149.4 associated with 83% <b>isw</b></p> <p>If non calculator method needs to be fully correct</p> | For <b>B1</b> 0.83 <b>oe</b> allow fraction but not just 83%  |

| Question | Answer   | Marks | Part marks and guidance   |
|----------|--|-------|---|
| 20       | [127] 148 149 296 in any order<br>With correct working | 5     | <p>“correct working” requires at least <b>M2</b></p> <p>180 × 4 can be implied by 720 throughout</p> <p><b>M3</b> for <math>4x</math> and 592<br/>or for <math>(180 \times 4 - 127 - 1) \div 4</math><br/><b>A1</b> for 148</p> <p>or</p> <p><b>M2</b> for a correct algebraic expression and correct constant<br/>or for <math>180 \times 4 - 127 [- 1]</math><br/>or for <math>127+148+149+296=180 \times 4</math> oe<br/>or for trials leading to the correct answer</p> <p>or</p> <p><b>M1</b> for <math>127 + x + x + 1 + 2x</math> nfw or <math>180 \times 4</math> or 720</p> <p>If <b>0</b> or <b>1</b> scored, instead award <b>SC2</b> for 148 149 296 in any order with no or insufficient working</p> <p>If <b>0</b> scored, <b>SC1</b> for <math>[x=]148</math></p> <p>eg <math>127 + x + x + 1 + 2x</math> and 720;<br/><math>4x + 1</math> and 593<br/>Do not accept <math>x</math>, <math>2x</math> or <math>x + 1</math> as correct algebraic expressions for <b>M2</b></p> <p>Condone e.g.<br/><math>127 + x + x + 1 + 2x \div 4</math> for <b>M1</b></p> <p>Mark to candidates advantage</p> |
| 21 (a)   | 2 points accurately plotted                            | 2     | <p><b>B1</b> for each</p> <p>tolerance <math>\pm \frac{1}{2}</math> small square radially and ignore other plotted points</p>   |
| (b)      | Negative   | 1     | <p>Ignore embellishments</p>  |

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|----------|--|----------------------------|--|
| (c)      | ruled straight line of best fit<br><br>5 – 6.5 | <b>B1</b><br><br><b>B1</b> | If <b>B0 FT</b> <i>their</i> ruled straight line of best fit with negative gradient and meeting both 500 and 1500<br><br>Overlay is a guide only, <i>their</i> line must be between or through (500, 8) to (500, 10) and (1500, 1) to (1500, 3) and meeting both 500 and 1500 lines  |
| (d)      | (1200, 9.2) indicated                          | <b>1</b>                   | Ignore points indicated as answers for parts (a), (c) and (f)  |
| (e)      | Accept any correct explanation                 | <b>1</b>                   | see appendix   |
| (f)      | 40   | <b>3</b>                   | <b>B1</b> for 6<br>if <b>2</b> not scored in (a) <b>FT</b> <i>their</i> diagram<br><br><b>M1</b> for $\frac{6 \text{ or } \textit{their} 6}{15 \text{ or } \textit{their} 15} [\times 100]$<br><br><b>M1</b> for correctly converting <i>their</i> fraction to a percentage (less than 100%) rounded or truncated<br><br>for <b>B1 FT</b> <i>their</i> diagram must not include a point for part (c)<br><br>for <b>M1</b><br><i>their</i> 6 is their number of points under 6°C<br><i>their</i> 15 is the total number of <b>plotted</b> points (may include one for (c) )<br><br>e.g. $\frac{7}{15} = 46$ or 47 or 46.6 to 46.7 |
| 22 (a)   | 11 -5  | <b>2</b>                   | <b>B1</b> for each   |
| (b)      | Correct curve                                  | <b>3</b>                   | <b>B2ft</b> for 7 or 8 points accurately plotted<br>or<br><b>B1ft</b> for 5 or 6 points accurately plotted<br><br>Tolerance $\pm \frac{1}{2}$ small square radially  |

| Question |     | Answer                     | Marks | Part marks and guidance   |   |
|----------|-----|----------------------------|-------|---|---|
|          | (c) | -2.3 or -2.2    2.2 or 2.3 | 2 FT  | Strict FT<br>B1 for either FT <i>their</i> graph  | If curve is between 2 grid lines accept either value as correct answer<br>Do not accept answers to more than 1d.p.<br>Do not allow $\pm\sqrt{5}$ or answers with no graph |
| 23       | (a) | 24.5    25.5 cao           | 2     | B1 for each<br><br>If 0 scored SC1 for correct but reversed<br>or for 24.50[0] and 25.50[0] |   |

| Question | Answer  | Marks   | Part marks and guidance   |   |
|----------|---|---|---|---|
| (b)      | <p>4 × 25.5 or 4 × <i>their</i> upper bound in (a)</p> <p>102 or correct answer to 4 × <i>their</i> upper bound<br/>Yes and <i>their</i> 102 &lt;/≤ 102.4 in symbols or words</p> <p><u>Alternative method 1</u><br/>102.4 ÷ 4</p> <p>25.6</p> <p>Yes and <i>their</i> 25.5 &lt;/≤ 25.6 in symbols or words</p> <p><u>Alternative method 2</u><br/>102.4 ÷ 25.5 or 102.4 ÷ <i>their</i> upper bound</p> <p>4.01(...) or correct answer to 102.4 ÷ <i>their</i> upper bound</p> <p>Yes and 4 &lt;/≤ <i>their</i> 4.01(...)</p> | <p><b>M1</b></p> <p><b>A1</b></p> <p><b>1 dep</b></p> <p><b>M1</b></p> <p><b>A1</b></p> <p><b>1 dep</b></p> <p><b>M1</b></p> <p><b>A1</b></p> <p><b>1 dep</b></p> | <p>Dep on previous 2 marks<br/>Conclusion and clear comparison <b>FT</b><br/>their upper bound in (a)</p> <p>Dep on previous 2 marks<br/>Conclusion and clear comparison <b>FT</b><br/>their upper bound in (a)</p> <p>Dep on previous 2 marks<br/>Conclusion and clear comparison <b>FT</b><br/>their upper bound in (a)</p> | <p><b>M0</b> if <math>w = 25</math> used</p> <p>Yes/ no conclusions must be consistent with their working</p> |

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| 24       | (a) | 122   | 4     | <p><b>B3</b> for 121.5[...] leading to an answer 121[.5...]<br/>                     or 1215.2[...] leading to an answer 1215<br/>                     or 12.15[...] leading to an answer 12</p> <p>OR</p> <p><b>M3</b> for <math>\frac{3.5 \times 1000 \times 100}{2 \times 60 \times 24}</math> oe</p> <p>OR</p> <p><b>M1</b> for correct time conversion to a day e.g. [2x] 60x24</p> <p>and</p> <p><b>M1</b> for one distance km to cm or one distance cm to km or two distances to metres</p> <p>and</p> <p><b>M1</b> for distance divided by rate e.g. <math>\frac{3.5 \times 100 \times 100}{2 \times 60 \times 24}</math><br/>                     to a maximum of <b>M2</b></p> |
|          | (b) | It will take less time [than <i>their</i> 122 days] | 1     | <p>accept any correct explanation (see appendix) and select best comment if more than one providing they do not conflict</p>   |

|    |  |   |   |   |
|----|--|---|---|---|
| 25 |  | 5.73 to 5.74 or 5.7<br>with correct working | <p><b>5</b></p> <p><b>M4</b> for <math>[r^3 =] \frac{1}{3} \times 12.3^2 \times 15.7 \div \frac{4}{3}\pi</math> oe<br/>or for <math>[r^3 =] \textit{their} 791.8 \div \frac{4}{3}\pi</math></p> <p>OR</p> <p><b>M3</b> for <math>\frac{4}{3}\pi r^3 = (\frac{1}{3} \times 12.3^2 \times 15.7)</math> oe<br/>or <math>\frac{4}{3}\pi r^3 = \textit{their} 791.8</math></p> <p>OR</p> <p><b>M1</b> for <math>\frac{1}{3} \times 12.3^2 \times 15.7</math> oe<br/><b>A1</b> for 791.7 to 791.8 or 792</p> <p><u>Trials</u><br/>We need value and its result for <b>M1</b><br/><b>M1</b> for <math>\frac{1}{3} \times 12.3^2 \times 15.7</math> oe<br/><b>A1</b> for 791.7 to 791.8 or 792<br/><b>M1</b> for a correct trial<br/><b>M1</b> for another correct trial</p> <p>If <b>0</b>, <b>1</b> or <b>2</b> scored instead award <b>SC3</b><br/>for answer 5.73 to 5.74 or 5.7 with no<br/>working or insufficient working</p> <p>If <b>0</b> or <b>1</b> scored instead award <b>SC2</b> for<br/>188.99 to 189.03 with no working or<br/>insufficient working</p> <p>If <b>0</b> scored <b>SC1</b> for 791.7 to 791.8 or<br/>792 with no working or insufficient<br/>working</p> | <p>“correct working” requires at least<br/><b>M3</b> or if trials are used <b>M1 M1 M1</b></p> <p>Notes:<br/>allow 151[.29] or 151.2 or 151.3<br/>for <math>12.3^2</math>,</p> <p>for <math>\frac{1}{3}</math> accept 0.33 or better and for<br/><math>\frac{4}{3}</math> accept 1.33 or better and for <math>\frac{4}{3}\pi</math><br/>accept 4.17 to 4.19</p> <p><i>their</i> 791.8 is 791.7 to 791.8 or<br/>792<br/>from correct use of given formula</p> <p><b>M3</b> implied by <math>V = \frac{4}{3}\pi r^3</math> and <math>V =</math><br/><i>their</i> 791.8<br/>do not lose <b>M1 A1</b> if further work<br/>on a sphere does not include this</p> |
|----|--|---|---|---|