

| <b>Question</b> |  | <b>Working</b>                                                                      | <b>Answer</b>  | <b>Mark</b> | <b>Notes</b>                                                                                                                                                                                     |
|-----------------|--|-------------------------------------------------------------------------------------|----------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1               |  | $\frac{75}{3000}$ or $\frac{0.075}{3}$ or $\frac{7.5}{300}$ or $\frac{0.75}{30}$ oe |                | 2           | M1 a ‘correct’ but un-simplified fraction (condone decimals in the fraction) eg $\frac{75 \times 10^{-3}}{3}$<br>or an answer of 0.025 or 2.5% or $2.5 \times 10^{-2}$ oe eg $25 \times 10^{-3}$ |
|                 |  |                                                                                     | $\frac{1}{40}$ |             | A1cao Do not ISW ignore any units eg $\frac{1\text{mm}}{40\text{mm}}$                                                                                                                            |
| <i>cas</i>      |  |                                                                                     |                |             | <b>Total 2 marks</b>                                                                                                                                                                             |

| <b>Question</b> |     | <b>Working</b> | <b>Answer</b> | <b>Mark</b> | <b>Notes</b>                                                                                                                                                            |
|-----------------|-----|----------------|---------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2               | (a) |                | 5.143         | 1           | B1                                                                                                                                                                      |
|                 | (b) |                | 6280          | 1           | B1 allow $628 \times 10$ or $628 \times 10^1$ or $6.28 \times 10^3$ or $6.280 \times 10^3$ or $62.8 \times 10^2$ $62.80 \times 10^2$ Do not accept $6.2800 \times 10^3$ |
|                 |     |                |               |             | <b>Total 2 marks</b>                                                                                                                                                    |

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|-----------------|--|----------------|---------------|-------------|------------------------------------------------------------------------------------------------------------|
| 3               |  |                | $4t^5v^2$     | 2           | B2<br>(B1 for an expression in which 2 of the terms have been simplified correctly. eg $4t^5$ or $4t^5v$ ) |
| <i>cas</i>      |  |                |               |             | <b>Total 2 marks</b>                                                                                       |

| <b>Question</b> |     | <b>Working</b> | <b>Answer</b>                                                                                | <b>Mark</b> | <b>Notes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------|-----|----------------|----------------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>4</b>        | (a) |                | 275                                                                                          | 1           | B1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                 | (b) |                | eg 'it would mean $n^2 = -9$ which is not possible' or 'all numbers are greater than 100' oe | 1           | <p>B1 a correct reason (which needs to refer to a value other than 37)<br/>eg</p> <ul style="list-style-type: none"> <li>• <math>n^2 = -9</math> or <math>n = \sqrt{-9}</math> or <math>7n^2 = -63</math> and idea this is not possible (eg <math>n^2</math> cannot be negative or <math>n</math> or <math>n^2 \geq 0</math> or needs to be a whole number/positive)</li> <li>• numbers cannot be less than 100</li> <li>• numbers are <math>&gt; 100</math> or <math>\geq 100</math></li> <li>• numbers are <math>\geq 107</math> or <math>&gt; 107</math></li> <li>• the smallest value is 107</li> <li>• the first term is 107 and terms increase /don't decrease</li> </ul> |
|                 |     |                |                                                                                              |             | <b>Total 2 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| <b>Question</b> |  | <b>Working</b>                                                                                                                                                                                                                       | <b>Answer</b>      | <b>Mark</b> | <b>Notes</b>                                                                                                                                                                                                                              |
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| <b>5</b>        |  | 6 180 000 000 oe eg $6.18 \times 10^9$ or<br>$61.8 \times 10^8$ or<br>20 600 000 oe eg $20.6 \times 10^6$ or<br>$2.06 \times 10^n$ where $n \neq 7$ or<br>$2 \times 10^7 + 0.6 \times 10^6$ or $2 \times 10^7 + 6 \times 10^5$<br>oe |                    | 2           | <p>M1 allow for a correct numerator in any form or for a correct answer in any form or for <math>2.06 \times 10^n</math> where <math>n</math> is an integer <math>\neq 7</math> or</p> <p>for a correct sum with the fraction removed</p> |
|                 |  |                                                                                                                                                                                                                                      | $2.06 \times 10^7$ |             | A1 Do not ISW mark their answer on the answer line or if no answer on the answer line their final answer.                                                                                                                                 |
|                 |  | <i>cas</i>                                                                                                                                                                                                                           |                    |             | <b>Total 2 marks</b>                                                                                                                                                                                                                      |

| Question | Working                                                          | Answer         | Mark | Notes                                                                                                                                                                                |
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| 6        | $6a^4c$ or $46656a^{24}c^6$ or $36^3a^{24}c^6$ or $6^6a^{24}c^6$ |                | 2    | M1 for correctly applying the power of 3 or the power of a 0.5 to all 3 terms or for an expression of 3 terms in the form $ma^p c^q$ with 2 of $m, p$ and $q$ correct or $a^{12}c^3$ |
|          |                                                                  | $216a^{12}c^3$ |      | A1 ISW Do not allow $6^3a^{12}c^3$                                                                                                                                                   |
|          | <i>cas</i>                                                       |                |      |                                                                                                                                                                                      |
|          |                                                                  |                |      | <b>Total 2 marks</b>                                                                                                                                                                 |

| Question | Working                                                                             | Answer                                                                   | Mark | Notes                                                                                                                                                                                  |
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| 7        | $\frac{9}{4} \left[ \div \right] \frac{15}{7}$ oe                                   |                                                                          | 3    | M1 for writing both mixed numbers as improper fractions. Do not need the division sign. Implied by the 2 <sup>nd</sup> M1                                                              |
|          | eg $\frac{9}{4} \times \frac{7}{15}$ oe eg $\frac{135}{60} \times \frac{28}{60}$ oe |                                                                          |      | M1 for inverting the 2 <sup>nd</sup> fraction and showing multiplying or for writing the improper fractions over a common denominator                                                  |
|          |                                                                                     | $\frac{63}{60} = 1\frac{1}{20}$<br>or<br>$\frac{21}{20} = 1\frac{1}{20}$ |      | A1 dependent on both Method marks being awarded.<br>For completion to the correct answer with full working shown.<br>We need to see the improper fraction followed by the mixed number |
|          |                                                                                     |                                                                          |      | <b>Total 3 marks</b>                                                                                                                                                                   |

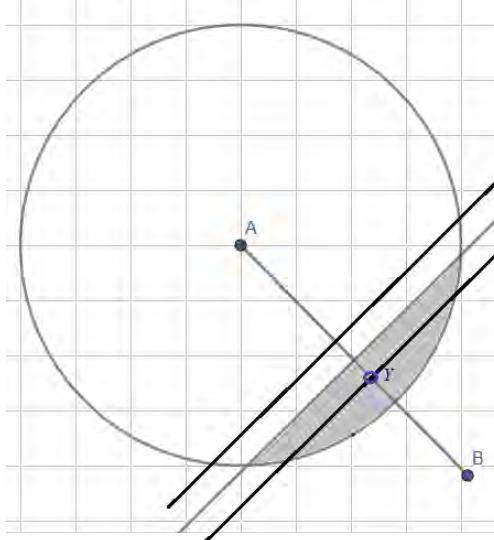
| Question | Working                                    | Answer             | Mark | Notes                                                                                                                                                      |
|----------|--------------------------------------------|--------------------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 8        | $3 \times 12x^2$ or $36x^2$                |                    | 3    | M1 for differentiating the first term correctly                                                                                                            |
|          | $\left[ \frac{16}{x^2} \right] = 16x^{-2}$ |                    |      | M1 for rewriting the second term as $16x^{-2}$ This can be seen anywhere including in an expression for dy/dx<br>May be implied by $-2 \times 16x^{-3}$ oe |
|          |                                            | $36x^2 - 32x^{-3}$ |      | A1 oe eg $36x^2 - \frac{32}{x^3}$<br>Need not be simplified eg allow $3 \times 12x^2 - 2 \times 16 \times x^{-3}$                                          |
|          |                                            |                    |      | <b>Total 3 marks</b>                                                                                                                                       |

| Question | Working | Answer | Mark | Notes |
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| <b>9</b>  | 39.5, 40.5, 2.15, 2.25, 0.55, 0.65                                                                               |                                 | 3 | M1 one correct bound allow 40.49 for 40.5, 2.249 for 2.25,<br>0.649 for 0.65                               |
|           | $\frac{UB_a}{LB_c - UB_f}$ where<br>$(40 < UB_a \leq 40.5)$<br>$(2.15 \leq LB_c < 2.2) - (0.6 < UB_f \leq 0.65)$ |                                 |   | M1 where<br>$40 < UB_a \leq 40.5$ and $2.15 \leq LB_c < 2.2$ and $0.6 < UB_f \leq 0.65$                    |
|           |                                                                                                                  | $\frac{40.5}{2.15 - 0.65} = 27$ |   | A1 for 26.97 to 27 if all correct figures seen in the equation.<br>Allow 40.49 for 40.5 and 0.649 for 0.65 |
| <i>wr</i> |                                                                                                                  |                                 |   | <b>Total 3 marks</b>                                                                                       |

| Question   | Working                                                                                                     | Answer          | Mark | Notes                                                                                                     |
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| <b>10</b>  |                                                                                                             | $y \geq -1$     | 4    | B1 oe accept > for $\geq$                                                                                 |
|            |                                                                                                             | $x + 2y \leq 8$ |      | B1 oe eg $y \leq 4 - \frac{x}{2}$ accept < for $\leq$                                                     |
|            | eg $y = 2x + 3$ or $y - 2x = 3$ or<br>$y - (1) = 2(x - (-1))$ oe                                            |                 |      | M1 for the correct equation for the line written in any form.<br>eg with any sign ( $= > < \geq \leq$ )   |
|            |                                                                                                             | $y \leq 2x + 3$ |      | A1 oe allow equivalent inequality eg $y - 2x \leq 3$ or<br>$y - (1) \leq 2(x - (-1))$ accept < for $\leq$ |
|            | <b>SC</b> if $y \leq -1$ and $x + 2y \geq 8$ and $y \geq 2x + 3$ score B2. Allow correct sign without the = |                 |      |                                                                                                           |
| <i>cas</i> |                                                                                                             |                 |      | <b>Total 4 marks</b>                                                                                      |

| Question | Working | Answer | Mark | Notes |
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| <b>11</b> | (a) |  | a circle centre $A$ with radius<br>4 cm | 1 | B1 full circle. Radius 4cm (allow if closer to $Y$ than to $B$ )                                                                                                                                                                                                                                                                                                                                                      |
|           | (b) |                                                                                   | a correct bisector with arcs shown      | 2 | B2 for a correct bisector with 2 pairs of arcs<br>Allow if it is only one side of the line $AB$ (use overlay) (NB may use the circle as one of the pair of arcs)<br>(B1 for a bisector without the arcs or only one pair drawn or correct arcs without bisector drawn (must cross with in the lines on overlay or would if they were extended))                                                                       |
|           | (c) |                                                                                   | correct region indicated                | 1 | B1 dep on at least B1 being awarded in (b) for the bisector drawn. For the correct region between the bisector and the circle identified. Allow if a partial circle around $A$ is drawn which intersects with their bisector twice and at least B1 awarded for the bisector drawn.<br>NB if they do not shade and just label $R$ they need to put $R$ both sides of the line $AB$ (if they have drawn the line $AB$ ) |
|           |     |                                                                                   |                                         |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                  |

| <b>Q</b> | <b>Working</b>                                                                                                                                                                                                                                                                                  | <b>Answer</b> | <b>Mark</b> | <b>Notes</b>                                                                                                                                                                                                                     |
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| 12       | eg $x^2 + x^2 = 12.6^2$ or<br>$[AC^2 =] (0.5 \times 12.6)^2 + (0.5 \times 12.6)^2 [= 39.69 + 39.69^2 = 79.38]$ or<br>eg $\sin 45 = \frac{AC}{12.6}$ or $\cos 45 = \frac{AC}{12.6}$ or<br>$\cos 45 = \frac{6.3}{AC}$ or $\sin 45 = \frac{6.3}{AC}$ oe                                            |               | 4           | M1 for a correct statement using Pythagoras or trigonometry to find side AB/AC<br>NB do not award for $AB^2 + AC^2 = 12.6^2$ unless made clear $AB = AC$ .<br>Allow AB instead of AC<br>May be Implied by the 2 <sup>nd</sup> M1 |
|          | $[x =] \sqrt{\frac{12.6^2}{2}} = \left[ \sqrt{\frac{3969}{25}} = 8.909\dots \right]$ or<br>$[AC =] \sqrt{(0.5 \times 12.6)^2 + (0.5 \times 12.6)^2} [= 8.9090\dots]$ or<br>$[AB/AC =] 12.6 \times \sin 45$ or $12.6 \times \cos 45$<br>$[AC/AB =] \frac{6.3}{\cos 45}$ or $\frac{6.3}{\sin 45}$ |               |             | M1 dependent on 1st M1 for a correct method to find AB or AC<br>Allow for 8.9 or better (actual 8.909545...) or<br>$\frac{63\sqrt{2}}{10}$<br>Allow 9 if $x^2 = 79.3\dots$ is seen                                               |
|          | $2 \times "8.909\dots" + 12.6$                                                                                                                                                                                                                                                                  |               |             | M1 independent of the previous method marks. Allow $\frac{63 + 63\sqrt{2}}{5}$<br>For using $2 \times n + 12.6$ where $6.3 < n < 12.6$<br>If n is incorrect, working must be shown                                               |
|          |                                                                                                                                                                                                                                                                                                 | 30.4          |             | A1 awrt 30.4 (actual 30.41909...)                                                                                                                                                                                                |
|          | <i>cas</i>                                                                                                                                                                                                                                                                                      |               |             | <b>Total 4 marks</b>                                                                                                                                                                                                             |

| <b>Qu</b> | <b>Working</b> | <b>Ans</b> | <b>Mar</b> | <b>Notes</b> |
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| 13 | $[QR =] \frac{8}{\tan 40} \text{ or } \tan 40 = \frac{8}{QR} \text{ or } \tan 50 = \frac{QR}{8} \text{ or } \frac{QR}{\sin 50} = \frac{8}{\sin 40} \text{ oe}$<br>$[PR =] \frac{8}{\sin 40} \text{ or } \frac{8}{\cos 50} (= 12.445...) \text{ or } \sin 40 = \frac{8}{PR} \text{ or } \cos 50 = \frac{8}{PR} \text{ oe}$                                                                                                                                                                                                                                                                                                                                                                                            |    | 4 | M1 for a correct method or expression to find $QR$ or $PR$ . Allow any letter(s) for $QR/PR$ or mislabelling or equivalents eg<br>$[QR=] 8 \tan 50 (= 9.534...)$<br>If no working shown allow for awrt 12 or awrt 10                                                                                                                                                                                                                                                                                                                                          |
|    | eg $[QR =] \frac{8}{\tan 40} (= 9.534...) \text{ AND } [PR =] \frac{8}{\sin 40} \text{ or } \frac{8}{\cos 40} (= 12.445...) \text{ oe or}$<br>$[QR =] \frac{8}{\tan 40} (= 9.534...) \text{ AND } [PR =] \sqrt{8^2 + "9.534..."^2} (= 12.445...) \text{ oe or}$<br>$[PR =] \frac{8}{\sin 40} (= 12.445...) \text{ AND } [QR =] \sqrt{"12.445..."^2 - 8^2} (= 9.534...) \text{ oe or}$<br>area of $PTR = 0.5 \times \pi \times \left( \frac{"12.445..."}{2} \right)^2 [= 60.8...] \text{ or}$<br>area of $PQR = \frac{1}{2} \times 8 \times "9.534..." \text{ or } \frac{1}{2} \times 8 \times "12.445..." \times \sin(90 - 40) \text{ or}$<br>$\frac{1}{2} \times "12.445..." \times "9.534..." \sin 40 [= 38.1...]$ |    |   | M1 dependent on first M1 being awarded for a correct method or expression to find $QR$ AND $PR$ or $0.5PR$ . Allow equivalent expressions eg those allowed for the 1st M1<br><b>NB</b> $\frac{PR}{\sin 90} = \frac{QR}{\sin 50} = \frac{8}{\sin 40} \text{ oe gains M1M1}$<br>or for a correct method to find the area of the semicircle $PTR$ or a correct method to find area of $PQR$ using their $PR$ (from correct working) and $PQ = 8$<br>Allow numbers written to 1 dp.<br>When finding the areas "12.445" or "9.534" must come from correct working. |
|    | $0.5 \times "9.534..." \times 8 + 0.5 \times \pi \times \left( \frac{"12.445..."}{2} \right)^2 \text{ or}$<br>$0.5 \times 8 \times "12.445..." \sin(50) + 0.5 \times \pi \times \left( \frac{"12.445..."}{2} \right)^2 \text{ or}$<br>$0.5 \times "12.445..." \times "9.534..." \sin(40) + 0.5 \times \pi \times \left( \frac{"12.445..."}{2} \right)^2$                                                                                                                                                                                                                                                                                                                                                             |    |   | M1 correct method to find the whole area. If working is shown ft their $PR$ (diameter) and/or $PQ$ if clearly labelled or marked on the diagram or comes from correct working. Allow $\frac{"12.445..."}{2}$ or "6.22..." for the radius.                                                                                                                                                                                                                                                                                                                     |
|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 99 |   | A1 awrt 99 or awrt 98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|    | <i>cas</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |    |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

| Question | Working | Answer | Mark | Notes |
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| 14        | <p>eg <math>6x + 18y = 42</math> or <math>10x + 30y = 70</math></p> $\begin{array}{r} 6x + 10y = 20 \\ \hline 18x + 30y = 60 \end{array}$ <p>or</p> <p>eg <math>3\left(\frac{14-6y}{2}\right) + 5y = 10</math> or <math>3x + 5\left(\frac{14-2x}{6}\right) = 10</math></p> |                               | 4 | <p>M1 For balancing the equations (only condone one arithmetic error in multiplication). <b>and</b> correct operation to eliminate selected variable applied to all terms in their 2 equations)</p> <p><b>or</b> writing <math>x</math> or <math>y</math> in terms of the other variable and correctly substituting to gain an equation in one variable</p> |
|           |                                                                                                                                                                                                                                                                            | $x = -1.25$ or<br>$y = 2.75$  |   | A1 oe one correct value dep on M1<br>Allow fractions eg $-\frac{7}{4}$ and $\frac{11}{4}$                                                                                                                                                                                                                                                                   |
|           | eg $2 \times "-1.25" + 6y = 14$ oe or<br>$3x + 5 \times "2.75" = 10$ oe                                                                                                                                                                                                    |                               |   | <p>M1 (dep) correct method to find second variable – could start process again or use substitution.</p> <p>Dependent on previous M mark being awarded. If the value used is incorrect you may need to check their answer if full working not shown.</p>                                                                                                     |
|           |                                                                                                                                                                                                                                                                            | $x = -1.25$ and<br>$y = 2.75$ |   | A1 oe for both correct values dep on at least one of the method marks being awarded. If switched on the answer line allow if seen correct in working                                                                                                                                                                                                        |
| <i>wr</i> |                                                                                                                                                                                                                                                                            |                               |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                                                                                                        |

| Question | Working | Answer | Mark | Notes |
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|            |  |                                                                                                                                                                                   |                                |   |                                                                                                                                                                                                                                                                                                         |
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| <b>15</b>  |  | $c^2 = \frac{3y+5}{8-y}$ oe or $c\sqrt{8-y} = \sqrt{3y+5}$                                                                                                                        |                                | 4 | M1 for either squaring both sides to remove the square root or removing the denominator of the expression.                                                                                                                                                                                              |
|            |  | $8c^2 - c^2y = 3y + 5$ or<br>$8-y = \frac{3y}{c^2} + \frac{5}{c^2}$ or $8-y = \frac{3y+5}{c^2}$ oe                                                                                |                                |   | M1 dependent on 1 <sup>st</sup> M1 being awarded. For squaring both sides to remove the square root and removing the terms in $y$ from the denominator of the expression and expanding to gain a correct equation. Implies the previous M1                                                              |
|            |  | $8c^2 - 5 = 3y + c^2y$ oe or<br>$-c^2y - 3y = -8c^2 + 5$ oe or<br>$c^2y + 3y = 8c^2 - 5$ oe or<br>$y(-c^2 - 3) = -8c^2 + 5$ oe or<br>$-\frac{3y}{c^2} - y = \frac{5}{c^2} - 8$ oe |                                |   | M1 for collecting the $y$ terms on one side of the equation with the other terms on the other side. Allow one sign error<br><br>If the 2 <sup>nd</sup> M1 has not been awarded then ft their equation providing the equation has 4 distinct terms with exactly 2 in terms of $y$ . Allow one sign error |
|            |  |                                                                                                                                                                                   | $y = \frac{8c^2 - 5}{3 + c^2}$ |   | A1 oe eg $y = \frac{5 - 8c^2}{-c^2 - 3}$ or $y = \frac{8 - \frac{5}{c^2}}{\frac{3}{c^2} + 1}$ oe<br><br>(NB: if the final answer is missing $y = \dots$ but is otherwise correct, award full marks if $y =$ a correct expression has been seen in the working otherwise do not ISW)                     |
| <i>cas</i> |  |                                                                                                                                                                                   |                                |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                                                    |

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| <b>16</b>  |  | eg $8 \times 4.5 = 3CP$ or $\frac{8}{3} = \frac{CP}{4.5}$ or $\frac{8}{3} = \frac{x + (x+3)}{4.5}$<br>$\frac{8}{3} = \frac{r + (r-3)}{4.5}$ oe   |      | 4                    | M1 for forming a correct equation. Using the chord theorem.                                                                               |
|            |  | $[CP =] \frac{8 \times 4.5}{3} [=12]$ or $r = \frac{8 \times 4.5 + 3}{3 \times 2} [=7.5]$ or<br>$x = \frac{8 \times 4.5 - 3}{3 \times 2} [=4.5]$ |      |                      | M1 for a correct expression for $CP$ May be seen on diagram                                                                               |
|            |  | [circumference = ] $\pi \times ("12"+3)$ oe<br>$2 \times \pi \times "7.5"$ or $2\pi \times ("4.5"+3)$                                            |      |                      | M1 ft their $CP$ if it comes from correct working or is clearly labelled or on the diagram. Allow $3.14\dots$ or $\frac{22}{7}$ for $\pi$ |
|            |  |                                                                                                                                                  | 47.1 |                      | A1 awrt 47.1 or $15\pi$                                                                                                                   |
| <i>cas</i> |  |                                                                                                                                                  |      | <b>Total 4 marks</b> |                                                                                                                                           |

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| 17         | (a) | $\vec{OB} = \begin{pmatrix} 3 \\ -2 \end{pmatrix} - \begin{pmatrix} 5 \\ -9 \end{pmatrix}$ or $\begin{pmatrix} 3 \\ -2 \end{pmatrix} + \begin{pmatrix} -5 \\ 9 \end{pmatrix}$ or |                                         | 2 | M1 for a correct method to find $\vec{OB}$ or may be implied by one correct value ie $\begin{pmatrix} -2 \\ \dots \end{pmatrix}$ or $\begin{pmatrix} \dots \\ 7 \end{pmatrix}$ or for $\begin{pmatrix} 7 \\ -2 \end{pmatrix}$<br>Must be seen on (a)                |
|            |     |                                                                                                                                                                                  | $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$ |   | A1                                                                                                                                                                                                                                                                  |
|            | (b) | $\sqrt{(-2)^2 + 7^2} [= 7.28\dots]$ oe                                                                                                                                           |                                         | 2 | M1 allow use of 2 rather than -2 and -7 rather than 7. May be implied by a correct answer or awrt 7.28 Condone missing brackets around negative values.<br><br>Only ft their values from (a) or $\vec{OB}$ found in (b) if working shown (allow $\pm$ their values) |
|            |     |                                                                                                                                                                                  | $\sqrt{53}$                             |   | A1 ft their answer (as a simplified surd) to (a) or $\vec{OB}$ found in (b) Do not ISW. This mark implies the M1<br>If no working is shown you may need to check.                                                                                                   |
| <i>cas</i> |     |                                                                                                                                                                                  |                                         |   | <b>Total 4 marks</b>                                                                                                                                                                                                                                                |

| Question | Working | Answer | Mark | Notes |
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|            |     |                                                                                                                                     |                  |   |                                                                                                                                                                                                                                                                                               |
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| <b>18</b>  | (a) |                                                                                                                                     | $30 < h \leq 40$ | 1 | B1 condone $\leq$ for $<$ and vice versa                                                                                                                                                                                                                                                      |
|            | (b) | $5 \times 2 + 15 \times 26 + 25 \times 10 + 35 \times 24 + 45 \times 18$<br>$(= 2300)$<br><br>$10 + 390 + 250 + 840 + 810 (= 2300)$ |                  | 4 | M2 for at least 3 correct products using midpoints with intention to add.<br>(M1 for at least 3 products using frequency and a value within the interval with the intention to add. (allow use of upper/lower class bound) or for at least 3 correct products using midpoints without adding) |
|            |     | $\frac{"10 + 390 + 250 + 840 + 810"}{80} \left[ = \frac{"2300"}{80} \right]$                                                        |                  |   | M1 dep on at least M1 being awarded                                                                                                                                                                                                                                                           |
|            |     |                                                                                                                                     | 28.75            |   | A1oe allow $\frac{115}{4}$ or 28.7 or 28.8 or (29 from correct working)                                                                                                                                                                                                                       |
| <i>cas</i> |     |                                                                                                                                     |                  |   | <b>Total 5 marks</b>                                                                                                                                                                                                                                                                          |

| Question | Working                                              | Answer | Mark | Notes                                                                                                                                                                                                                          |
|----------|------------------------------------------------------|--------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 19       | $2x+3+5x-12+3x+1=32$ oe eg $10x-8=32$                |        | 5    | M1 for setting up an equation. Implied by $x=4$                                                                                                                                                                                |
|          | $x = \frac{32+8}{10} [= 4]$ oe or 7T vanilla = 13 oe |        |      | M1 rearranging to find a correct expression for $x$ or for 7T vanilla                                                                                                                                                          |
|          | $\frac{80}{360} \times 45 (= 10)$ oe                 |        |      | M1 Correct method to find the number for vanilla for 8Y eg<br>$45 - \frac{280}{360} \times 45$                                                                                                                                 |
|          | $3 \times "4" + 1 - "10"$ or                         |        |      | M1 dependent on the 1 <sup>st</sup> and 3 <sup>rd</sup> M1 being awarded.<br>Allow an answer of 3 or a correct method to find their difference. Ft their value of $x$ and 10 if clearly labelled or come from correct working. |
|          |                                                      | 3      |      | A1 dependent on 1st and 3rd method mark being awarded.<br><b>NB</b> the number 3 can be gained from incorrect working, so need to check it.<br>If no working is shown then award 5/5                                           |
|          |                                                      |        |      | <b>Total 5 marks</b>                                                                                                                                                                                                           |

| Question | Working | Answer | Mark | Notes |
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|           |     |                                                                                                               |      |   |                                                                                                                                        |
|-----------|-----|---------------------------------------------------------------------------------------------------------------|------|---|----------------------------------------------------------------------------------------------------------------------------------------|
| <b>20</b> | (a) | $7+3y = 2(4y-7-5)$ oe or<br>$7+3y+2 \times 5 = 2(4y-7)$ oe or<br>$\frac{7}{2} + \frac{3}{2}y + 5 = 4y - 7$ oe |      | 3 | M1 for dealing with the fraction (of 0.5) correctly. Condone missing brackets if they have recovered.                                  |
|           |     | $3y - 8y = -14 - 10 - 7$ oe eg $5y = 31$ or<br>$\frac{7}{2} + 5 + 7 = 4y - \frac{3}{2}y$ oe                   |      |   | M1ft previous stage as long as at least 4 terms to deal with – for collecting terms in $y$ on one side and number terms the other side |
|           |     | <i>wr</i>                                                                                                     | 6.2  |   | A1 dep on both the previous 2 Marks being awarded oe eg $\frac{31}{5}$                                                                 |
|           | (b) | $-35 = 8x - 2 \times -4.5$ oe or $x = \frac{A+2w}{8}$                                                         |      | 2 | M1 for a correct substitution into the given formula or for a correct rearrangement of the formula to make $x$ the subject             |
|           |     | <i>cas</i>                                                                                                    | -5.5 |   | A1 oe eg $\frac{-44}{8}$ or $\frac{-11}{2}$                                                                                            |
|           |     |                                                                                                               |      |   | <b>Total 5 marks</b>                                                                                                                   |

| Que | Working | Ans | M | Notes |
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|-----|---------|-----|---|-------|

|    |                                                                                                                                                                                                                                                                                                                                                                               |      |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21 | <p>eg <math>\{2\pi r^2 \text{ and } 2\pi(3r)^2\}</math> or <math>\left\{2\pi\left(\frac{R}{3}\right)^2 \text{ and } 2\pi R^2\right\}</math> or<br/> <math>2R^2 + R^2 + 2r^2 - r^2</math> or <math>2\pi R^2 + \pi R^2 + 2\pi r^2 - \pi r^2</math> or<br/> <math>2(3)^2 + (3)^2 + 2(1)^2 - (1)^2</math> or<br/> <math>2\pi(3)^2 + \pi(3)^2 + 2\pi(1)^2 - \pi(1)^2</math> oe</p> |      | 5 | <p>M1 surface areas of both hemispheres seen (need not be added and may be part of an equation)<br/> Or for a correct formula for the total surface area. Allow <math>\{2\pi(nr)^2 \text{ and } 2\pi(mr)^2\}</math> or <math>2(m)^2 + m^2 + 2(n)^2 - (n)^2</math> or <math>2\pi(m)^2 + \pi m^2 + 2\pi(n)^2 - \pi(n)^2</math> where <math>m = 3n</math><br/> Allow use of other letters<br/> May be implied by the 2<sup>nd</sup> M1</p>                                                  |
|    | $2\pi r^2 + 2\pi(3r)^2 + \pi(3r)^2 - \pi r^2 = 567\pi$ oe or<br>$2\pi R^2 + 2\pi\left(\frac{R}{3}\right)^2 + \pi R^2 - \pi\left(\frac{R}{3}\right)^2 = 567\pi$ oe or<br>$2(3)^2 + (3)^2 + 2(1)^2 - (1)^2 : 567$<br>$2\pi(3)^2 + \pi(3)^2 + 2\pi(1)^2 - \pi(1)^2 : 567\pi$                                                                                                     |      |   | <p>M1 a correct equation for the surface area of the solid<br/> eg <math>2(nr)^2 + 2(3nr)^2 + (3nr)^2 - (nr)^2 = 567</math><br/> or <math>28\pi r^2 = 567\pi</math> or <math>28r^2 = 567</math><br/> or <math>2R^2 + 2\left(\frac{R}{3}\right)^2 + R^2 - \left(\frac{R}{3}\right)^2 = 567</math><br/> Allow <math>2x^2 + 2(y)^2 + (y)^2 - x^2 = 567</math><br/> <math>2(y)^2 + (y)^2 + 2(x)^2 - (x)^2 : 567</math> where <math>y = 3x</math><br/> This implies the 1<sup>st</sup> M1</p> |
|    | [ $r =]$ 4.5 or [ $R =]$ 13.5                                                                                                                                                                                                                                                                                                                                                 |      |   | M1 for a correct value of the radius for either hemisphere. This implies the 2 <sup>nd</sup> M1                                                                                                                                                                                                                                                                                                                                                                                          |
|    | $\frac{1}{2} \times \frac{4}{3} \pi \times "4.5"^3 + \frac{1}{2} \times \frac{4}{3} \pi \times "13.5"^3 \left[ = \frac{243}{4} \pi + \frac{6561}{4} \pi \right]$                                                                                                                                                                                                              |      |   | <p>M1 a fully correct method to find the volume of the solid dep on at least one of the previous Method marks being awarded and is equivalent to<br/> <math>\frac{1}{2} \times \frac{4}{3} \pi \times "m"^3 + \frac{1}{2} \times \frac{4}{3} \pi \times "3m"^3</math> where <math>m</math> is a number<br/> (award 4 marks for <math>1701\pi</math>)</p>                                                                                                                                 |
|    | $wr$                                                                                                                                                                                                                                                                                                                                                                          | 5340 |   | A1 awrt to 5340 dependent on at least the 3 <sup>rd</sup> M1 mark being awarded from correct working (5343.8....)                                                                                                                                                                                                                                                                                                                                                                        |
|    |                                                                                                                                                                                                                                                                                                                                                                               |      |   | <b>Total 5 marks</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| <b>Question</b> |     | <b>Working</b>                                                                                                                                                                                                                                              | <b>Answer</b> | <b>Mark</b>                                                                                                                                         | <b>Notes</b>                                                                                                                                                                       |
|-----------------|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22              | (a) | $5\sqrt{2} + 11\sqrt{2}$ [=16 $\sqrt{2}$ ] or<br>$\sqrt{50+242+2\sqrt{50\times 242}} = [\sqrt{512}]$                                                                                                                                                        |               | 2                                                                                                                                                   | M1 writing $\sqrt{50}$ and $\sqrt{242}$ in the form $c\sqrt{2}$ and adding or for 16 $\sqrt{2}$ or for using $\sqrt{(\sqrt{50}+\sqrt{242})^2}$ and multiplying out or $\sqrt{512}$ |
|                 |     | <i>cas</i>                                                                                                                                                                                                                                                  | $8\sqrt{8}$   |                                                                                                                                                     | A1cao allow $a = 8$                                                                                                                                                                |
|                 | (b) | $\frac{12}{\sqrt{5}-1} \times \frac{\sqrt{5}+1}{\sqrt{5}+1}$ or $\frac{12}{\sqrt{5}-1} \times \frac{-\sqrt{5}-1}{-\sqrt{5}-1}$                                                                                                                              |               | 3                                                                                                                                                   | M1 multiply numerator and denominator by $\sqrt{5}+1$ or $-\sqrt{5}-1$                                                                                                             |
|                 |     | $\frac{12(\sqrt{5}+1)}{5-1}$ or $\frac{12(\sqrt{5}+1)}{4}$ or $\frac{12\sqrt{5}+12}{5-1}$ or $\frac{12\sqrt{5}+12}{4}$ or<br>$\frac{12(-\sqrt{5}-1)}{-5+1}$ or $\frac{12(-\sqrt{5}-1)}{-4}$ or $\frac{-12\sqrt{5}-12}{-5+1}$ or $\frac{-12\sqrt{5}-12}{-4}$ |               | M1 dep on previous M mark being awarded. denominator may be 4 terms which need to all be correct eg. $\frac{12(\sqrt{5}+1)}{5+\sqrt{5}-\sqrt{5}-1}$ |                                                                                                                                                                                    |
|                 |     | <i>wr</i>                                                                                                                                                                                                                                                   | $3\sqrt{5}+3$ |                                                                                                                                                     | A1 dep on both the previous marks being awarded. Allow $y = 3$ and $x = 5$ or $3+3\sqrt{5}$ do not allow $3(\sqrt{5}+1)$ and do not ISW                                            |
|                 |     |                                                                                                                                                                                                                                                             |               |                                                                                                                                                     | <b>Total 5 marks</b>                                                                                                                                                               |

| <b>Question</b> | <b>Working</b> | <b>Answer</b> | <b>Mark</b> | <b>Notes</b> |
|-----------------|----------------|---------------|-------------|--------------|
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|           |     |                                                                                                                            |                                 |   |                                                                                                                                                                                                                                                                                                                                                                  |
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| <b>23</b> | (a) | $6 \times (-4)^3 + k \times (-4)^2 - 26 \times -4 - 24 = 0$ or<br>$6 \times (-4)^3 + 19 \times (-4)^2 - 26 \times -4 - 24$ |                                 | 2 | M1 correct substitution of $x = -4$ into equation. Must be equal to zero (or implied by later working) or if substituting $x = -4$ and $k = 19$ into the expression we do not need it = 0 for this mark. Condone missing brackets around the $-4$                                                                                                                |
|           |     | $16k = 304$ or $k = \frac{304}{16}$ and $k = 19$ or<br>$-384 + 304 + 104 - 24 = 0$ and shown                               |                                 |   | A1 completion to show clearly that $k = 19$ either by completing equation correctly (must see at least one line of working after the first line) and $k = 19$ or for $-384 + 304 + 104 - 24 = 0$ and comment (eg shown, or # )                                                                                                                                   |
|           | (b) | $(6x^2 \dots)$                                                                                                             |                                 | 4 | M1 for a start to find the quadratic factor.                                                                                                                                                                                                                                                                                                                     |
|           |     | $(6x^2 - 5x - 6)$                                                                                                          |                                 |   | M1 for a correct 3 term quadratic                                                                                                                                                                                                                                                                                                                                |
|           |     | $(3x+2)(2x-3)$ or $(3x+2)(2x-3)(x+4)$                                                                                      |                                 |   | M1 dependent on the 2 <sup>nd</sup> M1 being awarded for correct factorisation of the quadratic. Do not allow fractions or decimals eg $(x-1.5)$ or $\left(x+\frac{2}{3}\right)$ (ie) <b>or</b> a correct use of the quadratic formula.<br>Implied by $-\frac{2}{3}$ and $\frac{3}{2}$ as two of the solutions<br>( Allow $-0.67$ or better for $-\frac{2}{3}$ ) |
|           |     |                                                                                                                            | $-4, -\frac{2}{3}, \frac{3}{2}$ |   | A1 oe $(-0.67$ or better for $-\frac{2}{3}$ ) dep on all 3 method marks being awarded. Do not ISW. Mark the answer on the answer line. If no answer on the answer line mark the final line of their working.                                                                                                                                                     |
| <i>wr</i> |     |                                                                                                                            |                                 |   | <b>Total 6 marks</b>                                                                                                                                                                                                                                                                                                                                             |

| Question | Working | Answer | Mark | Notes |
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|    |                                                                                                                                                                                                                                                                             |                  |   |                                                                                                                                                                                                                                                                                                                                                                  |
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| 24 | eg $\frac{0.5N+12.5}{N}$ or $\frac{N+25}{2N}$ or $\frac{p}{2p-25}$ or $\frac{25+y}{2y+25}$ oe                                                                                                                                                                               |                  | 6 | M1 for the probability that the first sweet is pink ( $N$ = number of sweets, $p$ = number of pink sweets, $y$ = number of yellow sweets) It must be seen as an expression in one letter and may be seen in an equation                                                                                                                                          |
|    | eg $\frac{0.5N+12.5}{N} \times \frac{0.5N+11.5}{N-1} = \frac{7}{19}$ or<br>$\frac{N+25}{2N} \times \frac{N+23}{2N-2} = \frac{7}{19}$ or<br>$\frac{p}{2p-25} \times \frac{p-1}{2p-26} = \frac{7}{19}$ or<br>$\frac{y+25}{2y+25} \times \frac{y+24}{2y+24} = \frac{7}{19}$ oe |                  |   | M1 for a correct equation for 2 pink sweets. Must be expressed using one variable.<br>This mark implies the 1 <sup>st</sup> M1                                                                                                                                                                                                                                   |
|    | eg $2.25N^2 - 235N - 2731.25 = 0$ or<br>$9N^2 - 940N - 10925 = 0$ or<br>$9p^2 - 695p + 4550 = 0$ or<br>$9y^2 - 245y - 7200 = 0$                                                                                                                                             |                  |   | M1 a correct 3 term quadratic for $N$ or $p$ or $y$ (allow any letter)<br>condone missing =0                                                                                                                                                                                                                                                                     |
|    | eg<br>$(9N+95)(N-115)$ or $(9p-65)(p-70)$ or<br>$(9y+160)(y-45)$ oe                                                                                                                                                                                                         |                  |   | M1 dep on 2 <sup>nd</sup> M1 for a correct method to solve their 3 term quadratic – if factorising allow brackets that multiply giving 2 correct terms, if formula used then allow one error. Working must be shown if the equation is incorrect. Seeing or using $N = 115$ or $p = 70$ or $y = 45$ implies the 3 <sup>rd</sup> and 4 <sup>th</sup> Method marks |
|    | $\frac{45}{115} \times \frac{44}{114}$                                                                                                                                                                                                                                      |                  |   | M1 for a correct calculation for the probability of 2 yellow sweets May be implied by a correct answer                                                                                                                                                                                                                                                           |
|    | wr                                                                                                                                                                                                                                                                          | $\frac{66}{437}$ |   | A1 oe eg 0.151(029...)<br>The correct answer will gain full marks if at least 2 method marks have been awarded.                                                                                                                                                                                                                                                  |
|    | <b>PTO for SC</b>                                                                                                                                                                                                                                                           |                  |   |                                                                                                                                                                                                                                                                                                                                                                  |
|    |                                                                                                                                                                                                                                                                             |                  |   |                                                                                                                                                                                                                                                                                                                                                                  |

|  |                                                                                                                                                                                                                                                                                                                                                      |  |  |                                                                                                                                                                                                                     |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>SC for yellow is 25 more than pink<br/>M0M1M1M1M0A0</b>                                                                                                                                                                                                                                                                                           |  |  |                                                                                                                                                                                                                     |
|  | $\frac{0.5N - 12.5}{N} \times \frac{0.5N - 13.5}{N-1} = \frac{7}{19} \text{ or}$ $\frac{N-25}{2N} \times \frac{N-27}{2N-2} = \frac{7}{19} \text{ or}$ $\frac{y-25}{2y-25} \times \frac{y-26}{2y-26} = \frac{7}{19} \text{ or}$ $\frac{p}{2p+25} \times \frac{p-1}{2p+24} = \frac{7}{19}$                                                             |  |  | M1 for a correct equation for 2 pink sweets. Must be expressed using one variable.                                                                                                                                  |
|  | $2.25N^2 + 240N - 3206.25 = 0 \text{ or}$ $9N^2 + 960N - 12825 = 0$ $9y^2 + 255y - 7800 = 0$ $9p^2 + 705p + 4200 = 0$                                                                                                                                                                                                                                |  |  | M1 a correct quadratic for $N$ , $p$ or $y$<br>condone missing $=0$                                                                                                                                                 |
|  | $[N =] \frac{240 \pm \sqrt{(240)^2 + 4 \times 2.25 \times 3206.25}}{2 \times 2.25} \text{ or}$ $[N =] \frac{-960 \pm \sqrt{960^2 + 4 \times 900 \times 12825}}{2 \times 9} \text{ or}$ $[y =] \frac{255 \pm \sqrt{255^2 + 4 \times 9 \times 7800}}{2 \times 9}$ $[p =] \frac{-705 \pm \sqrt{705^2 - 4 \times 9 \times 4200}}{2 \times 9} \text{ or}$ |  |  | M1 dep on 2 <sup>nd</sup> M1 for a correct method to solve their 3 term quadratic – if factorising allow brackets that multiply giving 2 correct terms, if formula used then allow one error. Working must be shown |
|  | <i>wr</i>                                                                                                                                                                                                                                                                                                                                            |  |  | <b>Total 6 marks</b>                                                                                                                                                                                                |

| Quest | Working                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ans    | Mark | Notes                                                                                                                                                                                                                                                                                                  |
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| 25    | $0.5 \times 8 \times 11 \times \sin 115 (= 39.877\dots)$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        | 5    | M1 for a correct method to find the area of triangle $ABC$                                                                                                                                                                                                                                             |
|       | $AC^2 = 11^2 + 8^2 - 2 \times 11 \times 8 \cos 115 (= 259.38\dots)$ or<br>$AC = \sqrt{11^2 + 8^2 - 2 \times 11 \times 8 \cos 115} (= 16.105\dots)$                                                                                                                                                                                                                                                                                                                                                                                                                                                     |        |      | M1 for a correct method to find the length of $AC^2$ or $AC$                                                                                                                                                                                                                                           |
|       | $\angle CAD = \sin^{-1} \left( \frac{\sin(53) \times 15}{16.105\dots} \right) [= 48.059\dots]$ AND<br>$\angle ACD = 180 - "48.059" - 53 (= 78.94\dots)$ or<br>$16.105\dots^2 = AD^2 + 15^2 - 2 \times AD \times 15 \cos 53$ or<br>$AD^2 = 16.105\dots^2 + 15^2 - 2 \times 16.105\dots \times 15 \cos "78.9\dots"$<br>$\left\{ \sqrt{"16.105\dots^2 - 11.979\dots^2} \text{ or } "16.105\dots" \cos \left[ \sin^{-1} \left( \frac{\sin(53) \times 15}{16.105\dots} \right) \right] [= 10.76\dots] \right\}$<br>AND $\left\{ \sqrt{15^2 - 11.979\dots^2} \text{ or } 15 \cos 53 [= 9.027\dots] \right\}$ |        |      | M1 for a correct method to find the angle $ACD$<br>or<br>Finding $AD^2$ NB $2 \times 15 \cos 53 = 18.054\dots$<br>the length $AD$ (19.79...)<br>For splitting triangle $ACD$ into 2 triangles with perpendicular $CE$ where $E$ is on $AD$ and finding the lengths $AE$ (10.76...) and $ED$ (9.027...) |
|       | $\frac{1}{2} \times 15 \times "16.105\dots" \sin("78.94\dots") + "39.877\dots"$ or<br>$\frac{1}{2} \times "19.79\dots" \times 15 \sin(53) + "39.877\dots"$ or<br>$\frac{1}{2} \times "16.105\dots" \times "19.79\dots" \left( \frac{\sin(53) \times 15}{16.105\dots} \right) + "39.877\dots"$ or<br>$\frac{1}{2} \times 15 \sin 53 \times "10.76\dots" + \frac{1}{2} \times 15 \sin 53 \times "9.027\dots" + "39.877\dots"$                                                                                                                                                                            |        |      | M1 dependent on all 3 M marks being awarded.<br>For a fully correct method to find the area<br><br>NB $15 \sin 53 = 11.979\dots$                                                                                                                                                                       |
|       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 158.42 |      | A1 for awrt 158 (allow 159)                                                                                                                                                                                                                                                                            |
|       | <i>cas</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |        |      | <b>Total 5 marks</b>                                                                                                                                                                                                                                                                                   |

| Question | Working                                                               | Answer           | Mark | Notes                                                                                                                                                                                                       |
|----------|-----------------------------------------------------------------------|------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 26       | eg $\frac{6(x+3)+4(x-2)}{(x-2)(x+3)}$                                 |                  | 5    | M1 writing the addition part as a correct fraction over a common denominator – need not be expanded and may be 2 separate fractions. Allow one sign error in numerator if expanded                          |
|          | eg $\frac{10(x+1)}{(x-2)(x+3)}$ or $\frac{10x+10}{x^2+x-6}$ oe        |                  |      | A1 a correct single fraction with numerator and denominator simplified – numerator and / or denominator may be factorised. This implies the 1st M1                                                          |
|          | $\frac{(5x-5)(x-2)}{(x+1)(x-1)}$ or $\frac{(5x-10)(x-1)}{(x+1)(x-1)}$ |                  |      | M1 for numerator <b>or</b> denominator factorised correctly into 2 brackets                                                                                                                                 |
|          | $\frac{5(x-1)(x-2)}{(x+1)(x-1)}$ or $\frac{5(x-2)}{(x+1)}$ oe         |                  |      | M1 for numerator <b>and</b> denominator fully factorised correctly including factor of 5 taken out (could be implied by further cancelling) This implies the 2 <sup>nd</sup> M1                             |
|          |                                                                       | $\frac{50}{x+3}$ |      | A1 dep on M3                                                                                                                                                                                                |
| ALT      | $\frac{(5x-5)(x-2)}{(x+1)(x-1)}$                                      |                  |      | M1 for numerator <b>or</b> denominator factorised correctly                                                                                                                                                 |
|          | $\frac{5(x-1)(x-2)}{(x+1)(x-1)}$ or $\frac{5(x-2)}{(x+1)}$            |                  |      | M1 for numerator <b>and</b> denominator fully factorised correctly including factor of 5 taken out (could be implied by further cancelling)                                                                 |
|          | $\frac{30(x+3)+20(x-2)}{(x+1)(x+3)}$ oe                               |                  |      | M1 for multiplying each part and writing the addition as a correct fraction over a common denominator – need not be expanded and may be 2 separate fractions. Allow one sign error in numerator if expanded |
|          | $\frac{50x+50}{(x+1)(x+3)}$ or $\frac{50(x+1)}{(x+1)(x+3)}$           |                  |      | M1 for numerator <b>and</b> denominator fully factorised correctly (could be implied by further cancelling)                                                                                                 |
|          |                                                                       | $\frac{50}{x+3}$ |      | A1 dep M3                                                                                                                                                                                                   |
|          | wr                                                                    |                  |      | <b>Total 5 marks</b>                                                                                                                                                                                        |