

Question		Answer	Mark	Part Marks and Guidance	
1		7.57	2	<p>B1 for 7.56[8...] or $\frac{2\sqrt{358}}{5}$ or 7.570</p> <p>If 0 scored SC1 for <i>their</i> positive answer to more than 3 figures correctly rounded to 3 s.f.</p>	Must see unrounded value
2		22.7[2...] or 22.73 or 23 or $\frac{250}{11}$	3	<p>M2 for $(1 - \frac{1.02}{1.32})$ [× 100] oe or $\frac{1.32-1.02}{1.32}$ [× 100] oe or $\frac{1.02-1.32}{1.32}$ [× 100] oe or M1 for $\frac{1.02}{1.32}$ [× 100] oe e.g. $\frac{17}{22}$</p>	<p>condone -22.7[2...] or -22.73 or -23 for 3 marks</p> <p>M2 implied by 0.227[2...] or 0.2273 or 0.23 or $\frac{5}{22}$</p> <p>M1 implied by 0.7727..., 0.77[3], 77.27, 77[.3] or 2270, 2272, 2273, 2300 Accept fully correct non-calculator methods</p>
3	(a)	960	2	M1 for $\frac{720}{3}$ [× 4] may be implied by 240 nfw	
	(b)	16	3	<p>accept any correct method</p> <p>M2 for e.g. <i>their</i> $(3 + 5) \times 2$ oe or $\frac{2}{3} \{3 \times (3 + 5)\}$ oe or [c=] $3(3 + 5) - (3 + 5)$ or M1 for e.g. $\frac{c}{3+5+c} = \frac{2}{3}$ oe or $3 \times c = 2(3 + 5 + c)$ or $c = \frac{2}{3}(3 + 5 + c)$ oe or $3 + 5 = \frac{1}{2}c$ or $\frac{1}{3}$ linked with 3 + 5</p>	<p>trials :</p> <p>M1 for each correct trial to a max of M2, we need to see the value c tried and the appropriate fraction</p>

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4	(a)	5850	3	<p>M2 for $[4500 +] 4500 \times [0].075 \times 4$ oe or M1 for $4500 \times [0].075$ oe</p>	<p>implied by 1350 implied by 337.5[0] or 4837.5[0] If they use compound interest, put MR M2 for $4500 \times (1 + \frac{7.5}{100})^4$ oe implied by 6009.6[1...] or 6010 or M1 for $4500 \times (1 + \frac{7.5}{100})^k$ ($k = 2, 3$ or 5) or interest only implied by e.g. 1509.6[1...] (see appendix)</p>																																																				
	(b)	27	3	<p>M2 for $\frac{13\,500 - 4500}{\text{their}337.50}$ oe or any correct method e.g. $\frac{13\,500 - \text{their } 5850}{\text{their}337.50} + 4$ or M1 for $13\,500 - 4500$ or $9\,000$ or $13\,500 - \text{their } 5850$</p> <p><u>Alternative method using trials</u> M1 for each correct trial over 4 evaluated correctly and rot to at least 3 s.f. to a maximum of M2</p> <p>If 0 scored SC1 for answer of 40 or 41 from $\frac{13\,500}{337.50}$ oe</p>	<p>Condone 26.66... or 26.[7] as answer for 3 marks.</p> <table border="1"> <tbody> <tr><td>5</td><td>6187.50</td><td>18</td><td>10575.00</td></tr> <tr><td>6</td><td>6525.00</td><td>19</td><td>10912.50</td></tr> <tr><td>7</td><td>6862.50</td><td>20</td><td>11250.00</td></tr> <tr><td>8</td><td>7200.00</td><td>21</td><td>11587.50</td></tr> <tr><td>9</td><td>7537.50</td><td>22</td><td>11925.00</td></tr> <tr><td>10</td><td>7875.00</td><td>23</td><td>12262.50</td></tr> <tr><td>11</td><td>8212.50</td><td>24</td><td>12600.00</td></tr> <tr><td>12</td><td>8550.00</td><td>25</td><td>12937.50</td></tr> <tr><td>13</td><td>8887.50</td><td>26</td><td>13275.00</td></tr> <tr><td>14</td><td>9225.00</td><td>27</td><td>13612.50</td></tr> <tr><td>15</td><td>9562.50</td><td>28</td><td>13950.00</td></tr> <tr><td>16</td><td>9900.00</td><td>29</td><td>14287.50</td></tr> <tr><td>17</td><td>10237.50</td><td>30</td><td>14625.00</td></tr> </tbody> </table> <p>If they use compound interest, put MR M1 for each correct trial over 4 evaluated correctly and rot to at least 3 s.f. to a maximum of M2 (See appendix)</p>	5	6187.50	18	10575.00	6	6525.00	19	10912.50	7	6862.50	20	11250.00	8	7200.00	21	11587.50	9	7537.50	22	11925.00	10	7875.00	23	12262.50	11	8212.50	24	12600.00	12	8550.00	25	12937.50	13	8887.50	26	13275.00	14	9225.00	27	13612.50	15	9562.50	28	13950.00	16	9900.00	29	14287.50	17	10237.50	30	14625.00
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5	(a)	3.86×10^{-3}	1		Condone trailing zeros
	(b)	29 635[.2] or 29 640 or 29 600	2	M1 for $3.43 \times 10^{-1} \times 60^2 \times 24$ oe If 0 scored SC1 for 14 817.6, 14 818, 14 820 or 14 800	Note: $60^2 \times 24 = 86\,400$
	(c)	5 with correct working	3	<p>M2 for $\sqrt[3]{\frac{4.41 \times 10^9}{120 \times 3.00 \times 10^5}}$ oe</p> <p>OR</p> <p>M1 for $\frac{4.41 \times 10^9}{3.00 \times 10^5}$ oe or $\frac{4.41 \times 10^9}{120}$ oe or $120 \times 3.00 \times 10^5$ oe</p> <p>If 0 scored SC1 for answer 5 with no or insufficient working</p>	<p>“Correct working” requires evidence of at least M1 or M2 if trials are used M2 implied by 4.966... or 4.97 or $\sqrt[3]{122.5}$ or $n^3 = 122.5$ condone use of a value $119 \leq \text{value} \leq 120$ instead of 120 which should lead to 4.98</p> <p>M1 may be seen within a larger calculation e.g. $\frac{4.41 \times 10^9}{120 \times 3.00 \times 10^5}$ or $\sqrt[3]{\frac{4.41 \times 10^9}{3.00 \times 10^5}}$</p> <p>M1 implied by 14 700 or 3.675×10^7 oe or 3.6×10^7 oe or 122.5</p> <p><u>use of trials</u> M1 for each correct trial using integer values of n up to a maximum of M2 e.g. $\frac{\text{their } 14700}{5^3}$ oe and 117 to 118 or 1.95 to 1.97</p> <p>$\frac{\text{their } 14700}{4^3}$ oe and 229[. ..] or 3.8[...]</p> <p><i>their</i> 14 700 comes from 3×10^5 and 4.41×10^9 (see appendix for more examples)</p>

Question		Answer	Marks	Part Marks and Guidance	
6		[f =] 7 [n =] 15	4	<p>B1 for [f =] 7 AND B3 for [n =] 15 or M2 for $50 \times 5.5 - (1 \times 12 + 3 \times 2 + 5 \times 9 + 6 \times 16 + 8 \times \textit{their } 7) [\div 4]$ or better or forming an equation and attempting to solve it correctly e.g. $(1 \times 12) + (3 \times 2) + (5 \times 9) + (6 \times 16) + (8 \times \textit{their } f) + (n \times 4) = 5.5 \times 50$ or better or M1 for 50×5.5 or 275 or $1 \times 12 + 3 \times 2 + 5 \times 9 + 6 \times 16 + 8 \times \textit{their } 7$ or 215</p>	<p>Note : if <i>f</i> is an error FT <i>their f</i> for the M marks</p> <p>M2 implied by 60 or 275 – <i>their</i> 215 better = $12 + 6 + 45 + 96 + \textit{their } 56$</p> <p>Common error is $1 + 3 + 5 + 6 + 8 = 23$ $5.5 \times 6 = 33$ and $33 - 23 = 10$ scores M0</p>
7	(a)	Two accurate curves	3	<p>B2 for 7 or 8 points plotted accurately or B1 for 5 or 6 points plotted accurately</p>	<p>Ignore the curve beyond points but the curve <u>must not cross or touch the y-axis</u></p> <p>tolerance $\pm \frac{1}{2}$ small square from correct points radially</p> <p>no excessive feathering, no ruled lines, no excessive ‘tram lines’</p> <p>overlay gives guidance only</p>
	(b)	A correct and accurate reading from <i>their</i> graph	1FT DEP.	<p>Dep. on a graph in (a) with at least one positive solution and strict FT <i>their</i> curve.</p>	<p>If curve crosses x-axis between two grid lines accept either grid line value as correct answer If <i>their</i> curve has more than one positive solution accept any of <i>their</i> correct solutions</p> <p>Do not accept answers to more than 1d.p., $\sqrt{3}$ or answers clearly rounded from this. CONDONE whole numbers where appropriate e.g. 2 for 2.0 Do not accept 0 as positive.</p>

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8	5.36 to 5.4 and correct working	6	<p>B5 for the correct answer in the wrong format with correct working e.g. 0.0536 OR M5 for $\frac{12^2 - \pi \times 6^2}{12^2 \times 4} [\times 100]$ oe</p> <p>OR</p> <p><u>Square</u> M1 for 12^2 or 144 or 6^2 or 36 (must be consistent with $\frac{1}{4} \times \pi \times 6^2$) and</p> <p><u>Circle</u> M2 for $\pi \times 6^2$ or $\frac{1}{4} \times \pi \times 6^2$ or M1 for radius of 6 may be implied e.g. $2 \times \pi \times 6$ (with π) and</p> <p>M1 for $(\text{their } 12^2 - \text{their } (\pi \times 6^2)) [\div 4]$ or $\text{their } (\pi \times 6^2) \div \text{their } 12^2$ or $\text{their } (6^2 - \text{their } (\frac{1}{4} \times \pi \times 6^2)) [\div \text{their } 12^2]$ or $\text{their } (\frac{1}{4} \times \pi \times 6^2) \div \frac{\text{their } 12^2}{4}$</p> <p>If 0 or M1 or M2 scored, instead award SC3 for answer 5.36 to 5.4 with no or insufficient working</p> <p>If 0 or M1 scored, instead award SC2 for 30.88 to 31 or 7.72 to 7.75 or 0.785 to 0.786 with no or insufficient working</p> <p>“Correct working” requires evidence of at least M1 AND M2 AND M1</p> <p>.</p> <p><i>their</i> 144 must come from attempt at area of a square</p> <p>M2 implied by 113.04 to 113.12 or 28.26 to 28.28 6 [cm] could be on diagram FT <i>their</i> incorrect 6 identified as radius implied by 30.88 to 31 or 7.72 to 7.75 implied by 0.785 to 0.786 implied by 7.72 to 7.75 implied by 0.785 or 0.7852 to 0.7856</p> <p><i>their</i> area of the circle has to be an attempt at πr^2 not $2\pi r$ so that, if they do not, the most they can be awarded is M1 for 144 and M1 for radius = 6 cm</p>

Question		Answer	Marks	Part Marks and Guidance	
9	(a)	16, 30, 34 in any order with correct working	5	<p>M1 for $x + 5 + 3x + 1 + 2x + 8 = 80$ may be implied by a subsequent correct equation</p> <p>M1 for simplifying <i>their</i> equation to $ax + b = c$ implied by $6x + 14 = 80$</p> <p>M1 for the first correct step in solving <i>their</i> $ax + b = c$ e.g. $6x = 80 - 14$</p> <p>M1 for substituting <i>their</i> 11 into $x + 5$, $3x + 1$ and $2x + 8$</p> <p><u>Alternative method using trials</u></p> <p>M2 for at least one complete correct evaluation of $x + 5 + 3x + 1 + 2x + 8$</p> <p>If 0 or 1 scored, instead award SC2 for 16, 30, 34 in any order with no or insufficient working</p> <p>If 0 scored SC1 for $x = 11$ with no or insufficient working</p>	<p>“Correct working” requires evidence of at least M1 leading to $x = 11$ or M2 if using trials</p> <p>Note for all methods: $x = 11$ scores M1M1M1 if there is some supporting work but on its own scores SC1</p> <p><u>Alternative method</u></p> <p>M2 for $80 - 5 - 1 - 8$ oe or 66 or M1 for $5 + 1 + 8$ or 14</p> <p>M1 for <i>their</i> $66 \div \text{their } 6$ implied by 11</p> <p>M1 for substituting <i>their</i> 11 into $x + 5$, $3x + 1$ and $2x + 8$</p>
	(b)	<i>Their</i> fully correct conclusion after M2 scored	3	<p>M2 for $\sqrt{(\text{their}16)^2 + (\text{their}30)^2}$ correctly evaluated</p> <p>or for $(\text{their}16)^2 + (\text{their}30)^2$ and $(\text{their}34)^2$ both correctly evaluated</p> <p>OR</p> <p>M1 for $\sqrt{(\text{their}16)^2 + (\text{their}30)^2}$ either not evaluated or incorrectly evaluated</p> <p>or for $(\text{their}16)^2 + (\text{their}30)^2$ and $(\text{their}34)^2$ either not evaluated or incorrectly evaluated</p> <p>or for $(\text{their}16)^2 + (\text{their}30)^2$ correctly evaluated</p>	<p>eg</p> <p>3 marks for</p> <p>Yes, $\sqrt{16^2 + 30^2} = 34$</p> <p>Yes, $16^2 + 30^2 = 1156$ and $34^2 = 1156$</p> <p>or eg after 15, 30, 34</p> <p>No, $15^2 + 30^2 = 1125$ and $34^2 = 1156$</p> <p>Adapt the scheme for equivalent correct methods e.g. Pythagoras using hypotenuse and subtraction</p>

Question		Answer	Marks	Part Marks and Guidance	
10	(a)	36 19 41 4	3	B2 for 36 or 19 or 41 correctly placed or B1 for the total of $F = 55$ or for the total of $S = 60$ or $F \cap S' + (F \cap S) + F' \cap S = 96$	Do not accept a blank region as 0, for any marks we need to see a number in each region
	(b) (i)	$\frac{77}{100}$ or 0.77 or 77%	2	FT $\frac{their(36+41)}{100}$ from <i>their (a)</i> for 2 or 1 marks or M1 for <i>their (36 + 41)</i> or 77	FT if $their(36 + 41) < 100$ and $0 < \text{fraction} < 1$
	(ii)	$\frac{19}{60}$ or 0.316 to 0.317 or 0.32	2	FT $\frac{their(19)}{their(19+41)}$ from <i>their (a)</i> for 2 or 1 marks B1 for 0.19 oe or $\frac{their19}{k}$ or $\frac{k}{their60}$ (k is an integer)	Accept e.g. 32% or 31.6 to 31.7% for 2 marks from <i>their (a)</i> and $0 < \text{fraction} < 1$
11		Rotation [centre] (2, 1) 180° OR Enlargement [centre] (2,1) [sf =] -1	3	B1 for each part If 0 scored M1 for the correct object after rotation or after both transformations	More than one transformation scores 0 or M1 Ignore direction of angle

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12	(a)	$3(x + 5)$ oe final answer	1		Equivalent includes $3x + 15$
	(b)	-7 with correct working	5	<p>accept any correct method</p> <p>B1 for [output =] $2 \times$ <i>their</i>$\{3(x + 5)\} - 1$ oe or output through inverse of B as $x + 1$</p> <p>B1dep for <i>their</i> $\{2 \times 3(x + 5) - 1\} = 2x + 1$ oe or output through inverse of A as $\frac{x+1}{3} - 5$ or $x + 1 =$ <i>their</i> $\{3(x + 5)\}$</p> <p>M1 for e.g. <i>their</i> $6x + 30 - 1 = 2x + 1$ or <i>their</i> $3x = x + 1 - 15$ or inverse method $\frac{x+1}{3} - 5 = x$</p> <p>M1 for <i>their</i> $\{4x = -28$ or $-2x = 14\}$ oe</p> <p><u>Alternative method using trials</u></p> <p>M2 for at least two complete correct evaluations of both $6x + 29$ oe(or functions) and $2x + 1$ or</p> <p>M1 at least one complete correct evaluation of both $6x + 29$ oe and $2x + 1$</p> <p>If 0 or 1 scored</p> <p>SC3 for answer -7 with no or insufficient working</p>	<p>“Correct working” requires evidence of at least B1B1 or B1M1 or M2 if using trials</p> <p>B1 implied by $2 \times 3(x + 5) - 1$ or better e.g. $6x + 30 - 1$</p> <p>dep. on previous B1</p> <p>Note: $3x + 15 + 2x - 1 = 2x + 1$ scores B0B0</p> <p>M1 B1 B1 implied by $6x + 29 = 2x + 1$</p> <p>The first M1 is for dealing with bracket(s) correctly in a linear equation and the second M1 is for correctly getting the linear equation, with x's on both sides, into the form $ax = b$.</p> <p>We can only follow through an equation with x's on both sides for M1 or x's on both sides and a bracket for M2.</p>
13	(a)	An error in the numerators identified	1		See appendix
	(b)	This question was discounted and all candidates were awarded 1 mark.	1		

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14	$\frac{1332}{2520}$ oe or 0.53 or 0.529 or 0.5286 or 0.52857... or 53% or 52.9%, 52.86% or 52.857% with correct working	5	<p> M4 for $1 - \frac{12}{14} \times \frac{9}{12} \times \frac{11}{15}$ oe OR M3 for $\frac{12}{14} \times \frac{9}{12} \times \frac{11}{15}$ OR M1 for $\frac{2}{14} \times \frac{3}{12} \times \frac{4}{15}$ OR M1 for [total choices=] $14 \times 12 \times 15$ implied by 2520 and M3 for $(2 \times 12 \times 15) + (12 \times 3 \times 15) + (12 \times 9 \times 4)$ or $360 + 540 + 432$ implied by 1332 or M2 for $(2 \times 12 \times 15) + (14 \times 3 \times 15) + (14 \times 12 \times 4)$ or $360 + 630 + 672$ implied by 1662 or M1 for one bracketed term correct from the M3 expression e.g $2 \times 12 \times 15$ OR M1 for [total choices=] $14 \times 12 \times 15$ implied by 2520 and M2 for [choices no languages=] $(14 - 2) \times (12 - 3) \times (15 - 4)$ implied by 1188 or M1 for this expression with one error and M1 for <i>their</i> 2520– <i>their</i> 1188 or 1332 If 0 or M1 scored SC2 for correct answer with no or insufficient working Note : For MR see appendix </p> <p> “Correct working requires evidence of at least M3 or M1M1M1 Equivs. Include $\frac{666}{1260}, \frac{333}{630}, \frac{111}{210}, \frac{37}{70}$ condone $\frac{1}{14} \times \frac{1}{12} \times \frac{1}{15} [= \frac{1}{2520}]$ for M1 [total choices] <u>Alternative equivalent methods</u> M4 for fully correct method leading to <i>their</i> 2520 and <i>their</i> 1332 or M1 for [total choices=] $14 \times 12 \times 15$ implied by 2520 and M3 for $(2 \times 3 \times 4) + (12 \times 3 \times 4 + 2 \times 9 \times 4 + 2 \times 3 \times 11) + (2 \times 9 \times 11 + 12 \times 3 \times 11 + 12 \times 9 \times 4)$ or $(24) + (144 + 72 + 66) + (198 + 396 + 432)$ implied by 1332 or M2 for this expression with at least two of the bracketed terms correct or M1 for at least one of the bracketed terms correct or any three of the individual terms correct e.g $2 \times 3 \times 4$ <u>Use of tree diagrams</u> See appendix </p>

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15		21	3	M1 for $y = \frac{k}{\sqrt{x}}$ oe e.g. $7 = \frac{k}{\sqrt{144}}$ (k anywhere) M1 for $y = \frac{\text{their } k}{\sqrt{16}}$ or B1 for $k = 84$	Alternative : M1 for $144 \div 16 [= 9]$ M1 for $7 \times \sqrt{\text{their } 9}$ Note : Direct proportionality leads to an answer of $\frac{7}{3}$ oe
16	(a)	Tuesday [0].65 oe and [0].35 oe in the correct places and Wednesday [0].65 oe with [0].35 oe and [0].3 oe with [0].7 oe in the correct places	2	B1 for one pair of probabilities correct in one branch e.g Tuesday or one of the Wednesday branches	
	(b)	[0].5275 or [0].528 or 0.53 or $\frac{211}{400}$ oe nfw	3	M2 for $[0].65 \times [0].65 + [0].35 \times [0].3$ oe or M1 for $[0].65 \times [0].65$ or $[0].35 \times [0].3$ oe implied by .4225 or .105 or $\frac{169}{400}$ or $\frac{21}{200}$ oe	If (a) is not correct FT <i>their</i> tree for 3 marks, M2 and M1 Allow 52.75%, 52.8% 53% for 3 marks
17	(a)	(i) [a] 67° and [angles in] alternate segment [are equal]	2	B1 for 67	Note : 0 for 59 (or any other value) and alternate segment Allow for reason : angle between chord and tangent equals angle in opposite segment
		(ii) [b] 23° [angle between] radius and tangent is 90° oe	1 1	FT $90 - \text{their } a$ (providing the answer is positive)	Condone these terms : diameter, perpendicular, right-angle
	(b)	(i) $2x$ [because] angle [subtended] at centre is twice angle at circumference oe $360 - 2x$ $180 - x$	1 1FT 1dep	STRICT FT e.g. $360 - \text{their } 2x$ Dep. on $2x$ and $360 - 2x$	Condone "inscribed angle theorem" and "central angle theorem" For $180 - x$ condone $\frac{360-2x}{2}$ Do not accept working back from (b)(ii) unless whole part is complete and correct
		(ii) Opposite angles [in a] cyclic quadrilateral [sum to] 180°	1		

Question		Answer	Mark	Part marks and Guidance	
18	(a)	$[1^3 + 1^2 - 5] = -3$ $[2^3 + 2^2 - 5] = 7$ Sign change [so solution between $x = 1$ and $x = 2$] or $-3 < 0 < 7$	M1 M1 A1	Must indicate their input and output Dep. on at least M1 and different signs <u>Alternative method 1</u> for $x^3 + x^2 = 5$ M2 for $1^3 + 1^2 = 2$ and $2^3 + 2^2 = 12$ or M1 for $1^3 + 1^2 = 2$ or $2^3 + 2^2 = 12$ may be implied by 2 or 12 and A1 for e.g. $2 < 5 < 12$ dep. on at least M1 and 5 lies inbetween <i>their</i> two values <u>Alternative method 2</u> SC3 for using an iterative equation that converges to a value between 1.35 and 1.45 and concluding statement such as $1 < 1.35$ to $1.45 < 2$ or SC2 for using an iterative equation that converges to a value between 1.35 and 1.45	Accept other values of x used between 1 and 2 (see table in part (b)). For full marks, the two values need to produce a sign change. Acceptable answers for third mark are $x = 1$ gives answer < 0 and $x = 2$ gives answer > 0 Note: so answer lies between 1 and 2 is not sufficient on its own or answer is in the middle is insufficient If within part (a) a candidate refers to their working in part (b) you must award the marks for this method

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18	(b)	Two correct evaluations in the range $1.35 \leq \text{values} \leq 1.49$, one which gives a positive value and the other giving a negative value 1.4	M3 A1	<p>M2 for two correct evaluations $1 < \text{values} < 2$, one which gives a positive value and the other giving a negative value or M1 for one correct evaluation between $1 < \text{value} < 2$</p> <p>Dependent on achieving at least M2</p> <p><u>Alternative method 1</u> See appendix for values of $x^3 + x^2$.</p> <p><u>Alternative method 2</u> M1 rearranges to a correct iterative formula (converging or diverging)</p> <p>M1 <u>attempts</u> first iteration (either substitution seen or found to at least 2dp rot)</p> <p>M1 continues iteration to reach x in the range 1.35 to 1.45</p> <p>A1 for 1.4 Dep. on M2</p> <p>OR If 0 scored SC1 for 1.4 with no worthwhile working</p>	<p>figures may be rot to at least 2 s.f.</p> <table border="1"> <thead> <tr> <th>x</th> <th>x^3+x^2-5</th> <th>x</th> <th>x^3+x^2-5</th> </tr> </thead> <tbody> <tr><td>1.1</td><td>-2.459</td><td>1.35</td><td>-0.71712</td></tr> <tr><td>1.2</td><td>-1.832</td><td>1.36</td><td>-0.63494</td></tr> <tr><td>1.3</td><td>-1.113</td><td>1.37</td><td>-0.55175</td></tr> <tr><td>1.4</td><td>-0.296</td><td>1.38</td><td>-0.46753</td></tr> <tr><td>1.5</td><td>0.625</td><td>1.39</td><td>-0.38228</td></tr> <tr><td>1.6</td><td>1.656</td><td>1.40</td><td>-0.29600</td></tr> <tr><td>1.7</td><td>2.803</td><td>1.41</td><td>-0.20868</td></tr> <tr><td>1.8</td><td>4.072</td><td>1.42</td><td>-0.12031</td></tr> <tr><td>1.9</td><td>5.469</td><td>1.43</td><td>-0.03089</td></tr> <tr><td></td><td></td><td>1.44</td><td>0.05958</td></tr> <tr><td></td><td></td><td>1.45</td><td>0.15113</td></tr> <tr><td></td><td></td><td>1.46</td><td>0.24374</td></tr> <tr><td></td><td></td><td>1.47</td><td>0.33742</td></tr> <tr><td></td><td></td><td>1.48</td><td>0.43219</td></tr> <tr><td></td><td></td><td>1.49</td><td>0.52805</td></tr> </tbody> </table> <p><i>condone missing suffixes in formula here</i> e.g. $x_{n+1} = \sqrt{\frac{5}{x_n+1}}$ converges and leads to values 1.5811388... , 1.39180797... , 1.44584536...</p> <p>If they refer to <i>their</i> working in part (a) which is relevant then award up to full marks in part (b)</p>	x	x^3+x^2-5	x	x^3+x^2-5	1.1	-2.459	1.35	-0.71712	1.2	-1.832	1.36	-0.63494	1.3	-1.113	1.37	-0.55175	1.4	-0.296	1.38	-0.46753	1.5	0.625	1.39	-0.38228	1.6	1.656	1.40	-0.29600	1.7	2.803	1.41	-0.20868	1.8	4.072	1.42	-0.12031	1.9	5.469	1.43	-0.03089			1.44	0.05958			1.45	0.15113			1.46	0.24374			1.47	0.33742			1.48	0.43219			1.49	0.52805
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Question		Answer	Mark	Part Marks and Guidance	
19		16.5 with correct working	5	<p>M1 for 11.55×20 implied by 231</p> <p>AND</p> <p>M2 for $\frac{1}{2} (20+(15-7)) \times v$ implied by $14v$ or $\frac{28v}{2}$ or M1 for an attempt at area e.g. one of the three areas correct e.g. $\frac{1}{2} \times 7 \times v$</p> <p>M1 for <i>their</i> $231 \div \text{their } 14$ oe</p> <p>If 0 or M1 scored, instead award SC2 for answer 16.5 with no or insufficient working</p>	<p>“Correct working” requires evidence of at least M1 AND M2</p> <p>Condone letters other than v and working could be on the diagram.</p> <p>in parts $\frac{1}{2} \times 7 \times v + (15-7) \times v + \frac{1}{2} \times (20-15) \times v$ For M2 allow a proportionality argument e.g. $\frac{1}{2} \times 7 \text{ mins} + (15-7) \text{ mins} + \frac{1}{2} \times (20-15) \text{ mins}$ [= 14 mins at v m/min]</p> <p><i>their</i> 231 is any number derived from 11.55 and implied by 0.825 and <i>their</i> 14 has got to be an attempt at the whole ‘area’ implied by e.g 20</p> <p>condone the use of trials, we must see one at 16.5, award M2 for a trial at 16.5 and M1 for any other positive trial (see appendix)</p>
20	(a)	<p>[cos BAC =] $\frac{10.6^2 + 12.5^2 - 8.2^2}{2 \times 10.6 \times 12.5}$ oe or better</p> <p>40.54...</p>	<p>M2</p> <p>M1 for $8.2^2 = 10.6^2 + 12.5^2 - 2 \times 10.6 \times 12.5 \times \cos[.]$ oe and</p> <p>M1dep for $0.7598\dots$ or $265 \cos[.] = 201.37$</p> <p>A1 Dep. on at least M1 scored</p> <p>If 0 scored award SC1 for 40.54...</p>	<p>Do not reward work from use of 40.5°.</p> <p>M2 implied by $\frac{201.37}{265}$ oe and accept 67.24 for 8.2^2 etc</p> <p>Dep. on previous M1</p> <p>For M2 and M1 accept alternative methods which must be correct and complete.</p>	
	(b)	43.02 to 43.07 or 43[.0] or 43.1	2	<p>M1 for $\frac{1}{2} \times 10.6 \times 12.5 \times \sin 40.5\dots$</p>	<p>For M1 accept alternative methods which must be correct and complete e.g using a different angle</p>