

**EDUQAS GCSE MATHEMATICS**

**AUTUMN 2021 MARK SCHEME**

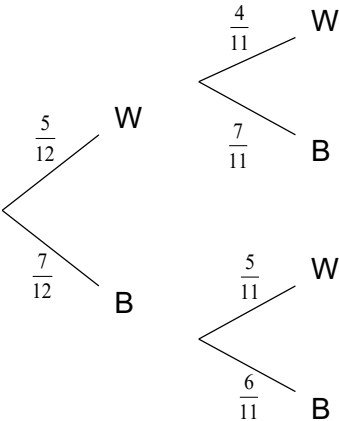
GCSE (9-1) Mathematics Component 2: Higher Tier	Mark	Comment
1.*(a) $6x - x = 5 + 1$ oe $x = \frac{6}{5}$ oe, ISW	B1  B1	FT from $ax = b$ , $a \neq 1$ or $5x = b$ accept $\frac{6}{a}$ or $\frac{b}{5}$ but if on FT either simplifies to an integer the answer must be given as an integer.  'x =' can be omitted but must not be wrong if there.  Correct answer implies first B1. Final answer of $x = \frac{-6}{-5}$ is B0.  <b>Maximum of 1 mark if not fully correct</b>
1.(b) A correct equation e.g. $2x + 10 = 116$ $2(x + 5) = 116$ $x + 5 = 58$ $x = 116 \div 2 - 5$ 53	B2  B1	B1 for $2(x + 5)$ or $2x + 10$
		If no marks award: SC2 for $x = 55.5$ following $2x + 5 = 116$ SC1 for $2x + 5 = 116$
2.* $130 \times 1.06^{10}$  (£)232.81	M2  A1	May be seen in stages. M1 for sight of $130 \times 1.06$ (= 137.8)  CAO An answer of (£)208 (simple interest) from use of $130 \times 0.06 \times 10 + 130$ is awarded M1 A0
3.*  (radius =) $\frac{40.841}{2\pi}$ (= 6.50...)  (Area =) $\pi \times \left(\frac{40.841}{2\pi}\right)^2$ (= $\pi \times 6.5^2$ ) 132.7(...) or 133 (cm <sup>2</sup> )	B2  M1  A1	B1 for $2\pi r = 40.841$ or $\pi d = 40.841$ or $\frac{40.841}{\pi}$ or 13.0  FT 'their derived radius'  CAO correct answer implies all previous marks
	(5)	
	(3)	
	(4)	

<p>4.*(a)</p> $\sin^{-1}\left(\frac{0.5}{6}\right)$ <p>4.7(8...)</p>	<p>M2</p> <p>A1</p>	<p>M1 for <math>\sin(\ ) = \frac{0.5}{6}</math></p> <p>Unsupported 4.7(8...) is awarded no marks</p>
<p>4.(b)</p> $\sqrt{1.8^2 - 0.6^2} (= 1.69705\dots)$ $\frac{\sqrt{1.8^2 - 0.6^2} \times 0.6}{2} \times 2.5$ <p>1.27(...) or 1.28 or 1.3 (m<sup>3</sup>)</p>	<p>M2</p> <p>M1</p> <p>m1</p> <p>A1</p>	<p>M1 for <math>1.8^2 - 0.6^2</math> or <math>x^2 + 0.6^2 = 1.8^2</math></p> <p>Allow FT from use of <math>\sqrt{1.8^2 + 0.6^2} (= 1.897\dots)</math></p> <p>CAO</p>
<p>5.*(a)(i)</p> $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$	<p>B2</p>	<p>B1 for sight of <math>\begin{pmatrix} 3 \\ -5 \end{pmatrix} + \begin{pmatrix} 3 \\ 4 \end{pmatrix}</math></p> <p>Allow B1 for <math>\begin{pmatrix} 6 \\ -1 \end{pmatrix}</math> written incorrectly e.g. <math>\begin{pmatrix} 6 \\ -1 \end{pmatrix}</math></p>
<p>5.(a)(ii)</p> <p>Correct shape B drawn at (2, 1), (2, 4), (3, 4), (3, 2), (4, 2), (4, 1),</p>	<p>B2</p>	<p>or correct FT;</p> <p>FT 'their' <math>\begin{pmatrix} 6 \\ -1 \end{pmatrix}</math>,</p> <p>B1 for a translation attempted with at least 4 vertices correct or shape A correctly translated by <math>\begin{pmatrix} 6 \\ y \end{pmatrix}</math> where <math>y \neq -1</math> or <math>\begin{pmatrix} x \\ -1 \end{pmatrix}</math> where <math>x \neq 6</math></p> <p>If no marks in (a) then award SC1 for a clear attempt to translate by <math>\begin{pmatrix} 3 \\ -5 \end{pmatrix}</math> and <math>\begin{pmatrix} 3 \\ 4 \end{pmatrix}</math>.</p>
<p>5.(b)</p> <p>Reflection (in the line) <math>y = x</math></p>	<p>B2</p>	<p>B1 for either stating a reflection or giving the equation <math>y = x</math></p> <p>Award no marks if more than one transformation indicated</p> <p>If no marks then award SC1 for a correct diagram with the line <math>y = x</math> drawn.</p>
<p>(6)</p>		

<p>6.*  <math>a + 4c = 16.30</math> and <math>2a + 3c = 19.10</math></p> <p>Method to eliminate an unknown e.g. equal coefficients and subtraction</p> <p>or rearranges one equation and substitutes into the other</p> <p>Finds one unknown</p> <p>Finds the other unknown or finds <math>16.3(0) + 19.1(0) - 6 \times 2.7(0)</math></p> <p>(£)19.2(0)</p>	<p>B1</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>B1</p>	<p>May use other letters or words throughout</p> <p>FT their equations provided one is correct and the other is linear in the same pair of unknowns</p> <p>Allow one error in one term, but not in the equated coefficients</p> <p>CAO <math>a = 5.5(0)</math> or <math>c = 2.7(0)</math></p> <p>FT 'their <math>a</math>' or 'their <math>c</math>' used in one of their equations</p> <p>FT 3('their derived <math>a</math>') + ('their derived <math>c</math>') or <math>35.4 - 6 \times</math> 'their derived <math>c</math>' provided at least one mark previously awarded.</p> <p>Unsupported 19.2(0) is awarded no marks</p>
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<p>7.(a)  <math>7x^2 + 5x - 42x - 30</math></p> <p><math>7x^2 - 37x - 30</math></p>	<p>B2</p> <p>B1</p>	<p>B1 for any three terms correct;  <math>nx^2 - 37x + m</math> implies two terms correct if not from wrong working</p> <p>Implies previous B2.  FT for equivalent level of difficulty, providing 4 terms to consider and like terms to collect</p>
<p>7.(b)  <math>(y - 2)(y + 4)</math></p>	<p>B2</p>	<p>B1 for <math>(y \dots 2)(y \dots 4)</math></p>
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<p>8.(a)  Midpoints 30, 60, 90, 125</p> <p><math>30 \times 68 + 60 \times 186 + 90 \times 238 + 125 \times 108</math>  <math>(2040 + 11160 + 21420 + 13500 = 48120)</math></p> <p style="text-align: right;"><math>\div 600</math></p> <p>80.2(minutes) oe</p>	<p>B1</p> <p>M1</p> <p>m1</p> <p>A1</p>	<p>FT 'their midpoints' provided at least 3 of 'their 4 midpoints' lie within the appropriate group, including lower and upper bounds for the last 3 marks</p> <p>Note: final answer 79.3 follows from using the midpoints 30, 60, 90, 120 to find <math>\frac{47580}{600}</math>.</p>
<p>8.(b)  (Best estimate) 77.2(minutes) oe</p> <p>OR for a clear explanation that we cannot tell e.g.  'We do not know how many values will change group' or 'Slightly less as a few will move to the group below'.</p>	<p>B1</p>	<p>FT 'their 80.2' - 3</p> <p>Do not award the mark if the explanation is contradicted by 'the mean will be higher'.</p>
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(5)		

9.(a) -4	B1	
9.(b) All 7 correct points plotted correctly and joined with a smooth curve	B2	Tolerance $\pm$ a small square; FT 'their points' and 'their curve' for 2 marks provided the curve is reasonably parabolic  B1 for a smooth curve at least through 4 pairs of coordinates or for all of 'their 7 pairs of coordinates' plotted correctly
9.(c) -1, 3	B1	Must be exact as values given in the table. Do not award for (-1, 0) and (3, 0)
9.(d) The line $y = 1$ drawn  $x = -1.2$ to $-1.3$ $x = 3.2$ to $3.3$	B1  B1 B1	Allow for appropriate marks on the curve at $y = 1$ for at least one intersection  FT 'their curve' provided there are at least 2 intersections; if their curve has more than 2 intersections with $y = 1$ , they must give all their solutions for B2.  Allow these marks for calculated solutions e.g. $x = -1.2360\dots$ and $x = 3.2360\dots$  Award B1 only if both solutions are given as coordinates e.g. (-1.2, 1) and (3.2, 1)
	(7)	
10.(a)(i) 82	B1	
10.(a)(ii) $8\sqrt{2}$	B1	
10.(b) $n^2 + n$ oe	B2	Accept unsimplified e.g. $n \times n + n$  B1 for $n^2 + kn + c$ where $k$ and $c$ are not both 0
10.(c) $2n + 2$ and $2n + 4$ $(2n + 2n + 2 + 2n + 4 =) 6n + 6$  Convincing statement of divisibility by 6 e.g. $= 6(n + 1)$ or 'both terms divide by 6'	B1  B1  E1	oe  FT $2n +$ 'their $2n + 2$ ' + 'their $2n + 4$ '  oe
	(7)	

<p>11. Sight of <math>(1 - 0.38 =) 0.62</math> and <math>(1 - 0.16 =) 0.84</math> OR <math>((1 - 0.38)(1 - 0.16) =) 0.5208</math> oe</p> <p><math>(6510 \div 0.84)</math> oe <math>\div 0.62</math> oe</p> <p>(£)12 500</p>	<p>B1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>FT 'their <math>1 - 0.16</math>' or 'their <math>1 - 0.38</math>'; implied by sight of 7750 or 10 500</p> <p>Division may be done in either order</p> <p>M2 for sight of <math>6510 \div 0.5208</math>; FT 'their <math>(1 - 0.38)(1 - 0.16)</math>'</p> <p>CAO</p> <p>If no marks award SC1 for an answer of (£)14 152(.17) from a reduction of 54%</p>																																																												
(4)																																																														
<p>12.</p> <p>One correct evaluation with <math>3 \leq x \leq 4</math></p> <p>Two correct evaluations with <math>3.25 \leq x \leq 3.45</math> and one <math>&gt; 40</math>, one <math>&lt; 40</math> soi</p> <p>Two correct evaluations with <math>3.25 \leq x \leq 3.35</math> and one <math>&gt; 40</math>, one <math>&lt; 40</math> soi</p> <p>3.3</p>	<p>B1</p> <p>B1</p> <p>M1</p> <p>A1</p>	<p>Correct evaluation enough to imply <math>&gt; 40</math> or <math>&lt; 40</math>; If evaluations not seen then may be implied by e.g. 'too big' or 'too small';</p> <p>Solving <math>x^3 + x - 40 = 0</math> should be marked equivalently</p> <p>Providing at least B1 awarded allow this M1 for a clear statement of the solution, e.g. between 3.3 and 3.4.</p> <table border="1" data-bbox="821 1144 1380 1646"> <thead> <tr> <th><math>x</math></th> <th><math>x^3 + x</math></th> <th>or</th> <th><math>x^3 + x - 40</math></th> </tr> </thead> <tbody> <tr><td>3</td><td>30</td><td></td><td>-10</td></tr> <tr><td>3.1</td><td>32.891</td><td></td><td>-7.109</td></tr> <tr><td>3.2</td><td>35.968</td><td></td><td>-4.032</td></tr> <tr><td>3.25</td><td>37.578...</td><td></td><td>-2.421...</td></tr> <tr><td>3.3</td><td>39.237</td><td></td><td>-0.763</td></tr> <tr><td>3.35</td><td>40.945...</td><td></td><td>0.945...</td></tr> <tr><td>3.4</td><td>42.704</td><td></td><td>2.704</td></tr> <tr><td>3.45</td><td>44.513...</td><td></td><td>4.513...</td></tr> <tr><td>3.5</td><td>46.375</td><td></td><td>6.375</td></tr> <tr><td>3.6</td><td>50.256</td><td></td><td>10.256</td></tr> <tr><td>3.7</td><td>54.353</td><td></td><td>14.353</td></tr> <tr><td>3.8</td><td>58.672</td><td></td><td>18.672</td></tr> <tr><td>3.9</td><td>63.219</td><td></td><td>23.219</td></tr> <tr><td>4</td><td>68</td><td></td><td>28</td></tr> </tbody> </table>	$x$	$x^3 + x$	or	$x^3 + x - 40$	3	30		-10	3.1	32.891		-7.109	3.2	35.968		-4.032	3.25	37.578...		-2.421...	3.3	39.237		-0.763	3.35	40.945...		0.945...	3.4	42.704		2.704	3.45	44.513...		4.513...	3.5	46.375		6.375	3.6	50.256		10.256	3.7	54.353		14.353	3.8	58.672		18.672	3.9	63.219		23.219	4	68		28
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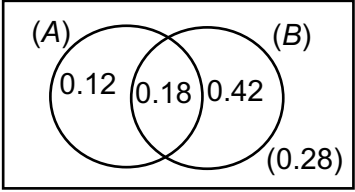
<p>13.(a) Correct tree diagram e.g.</p> 	<p>B3</p>	<p>B1 for left hand branches correct  FT 'their <math>\frac{5}{12}</math> or <math>\frac{7}{12}</math>'  B1 FT for top right branches correct  B1 FT for bottom right branches correct    Allow equivalent fractions in all cases.    If rounded decimals used here  e.g. 0.42, 0.58, 0.36, 0.64, 0.45 and 0.55 award  B1 here and FT in (b) and (c) for M marks only.</p>
<p>13.(b)  <math>1 - \frac{7}{12} \times \frac{6}{11}</math> or <math>\frac{5}{12} \times \frac{4}{11} + \frac{5}{12} \times \frac{7}{11} + \frac{7}{12} \times \frac{5}{11}</math> oe    <math>\frac{90}{132}</math> or <math>\frac{15}{22}</math> oe</p>	<p>M1  A1</p>	<p>Check tree diagram  FT 'their probabilities' providing at least B1 awarded in (a)    FT 'their tree diagram'    If no marks award SC1 for the correct sum of two of the required products e.g for:  <math>\frac{5}{12} \times \frac{7}{11} + \frac{7}{12} \times \frac{5}{11} = \frac{70}{108}</math> oe</p>
<p>13.(c)  <math>\frac{5}{12} \times \frac{7}{11} \times \frac{6}{10} + \frac{7}{12} \times \frac{6}{11} \times \frac{5}{10}</math> oe    <math>\frac{420}{1320}</math> or <math>\frac{7}{22}</math> oe</p>	<p>M2  A1</p>	<p>Check tree diagram  M1 for either product    CAO</p>
<p>14.(a) 28 000</p>	<p>B1</p>	
<p>14.(b)  (end of 2024). <math>1.12^3 \times 28\,000</math> (= 39 337.984)    (end of 2025)  <math>1.12 \times 39\,337(.984) = 44\,058(.54\dots)</math>  or 44059 or 44 057(.44)    (44 058.54... – 39 337.984 =) 4720 or 4721</p>	<p>M1  M1  A1</p>	<p>Allow values to be consistently rounded or truncated  FT '1.12<sup>3</sup> × (their 28 000)'; may be seen in stages  (end of 2021) <math>1.12 \times 28\,000</math> (= 31 360 )  (end of 2022) <math>1.12 \times 31\,360</math> (= 35 123.2 )  (end of 2023) <math>1.12 \times 35\,123(.2)</math> (= 39 337.984)    FT 'their 39 337....'  Interpretation of the formula as e.g.  <math>25\,000(1.12)^5 - 25\,000(1.12)^4</math> implies M1 M1</p>
<p>14.(c)  Finds (end of 2026 = ) 49 345(.56....)  or (end of 2027 = ) 55 267(.03....)    Yes indicated and sufficient work to show the population is both below and above 50 000 during 2017</p>	<p>S1  B1</p>	<p>FT 'their 44058(..) if a step-by-step method used  Accept 49 343 to 49 346  Accept 55 264 to 55 268  Allow for appropriate use of <math>25000 \times 1.12^n</math> where n is a decimal between 6 and 7  FT 'their 44058(..) and the correct FT conclusion    If no marks award SC1 for the correct conclusion following incorrect work in (b)</p>
	<p>(8)</p>	
	<p>(6)</p>	

<p>15.(a)</p> <p>(Height of pyramid removed = ) 4 (cm)</p> $\frac{1}{3} \times 24 \times 12^2 - \frac{1}{3} \times 4 \times 2^2 (= 1152 - 5.33\dots)$ $\frac{3440}{3} \text{ or } 1146.6(66\dots) \text{ or } 1146.7$ <p>(Mass = ) <math>0.9 \times \frac{3440}{3}</math></p> <p>1032 (grams)</p> <p>Valid assumption e.g.          'No wax is lost when the wax is cut.' or 'The mass of the wick is negligible.' or 'The wick can be ignored.' or 'The volume of the wick is negligible.' or 'The wick has the same density as the wax.'</p>	<p>B1</p> <p>M2</p> <p>A1</p> <p>M1</p> <p>A1</p> <p>E1</p>	<p><b>Mark using one method only, to the candidate's advantage</b></p> <p>FT 'their 4' provided &lt; 24</p> <p>M1 for <math>\frac{1}{3} \times 24 \times 12^2</math> or <math>\frac{1}{3} \times 4 \times 2^2</math></p> <p>FT 'their 4'</p> <p>Allow 1147 from correct working</p> <p>FT 'their <math>\frac{3440}{3}</math>'</p> <p>CAO</p> <p>Award for 1031.9(4) to 1032.3</p>
<p><b>Alternative Method 1 for first 6 marks (difference of masses):</b></p> <p>(Height of pyramid removed = ) 4 cm</p> $\frac{1}{3} \times 24 \times 12^2 \text{ or } \frac{1}{3} \times 4 \times 2^2$ $0.9 \times \frac{1}{3} \times 24 \times 12^2 \text{ and } 0.9 \times \frac{1}{3} \times 4 \times 2^2$ $\left( 0.9 \times \frac{1}{3} \times 24 \times 12^2 \right) - \left( 0.9 \times \frac{1}{3} \times 4 \times 2^2 \right)$ <p>1032 (grams)</p>	<p>B1</p> <p>M1</p> <p>M2</p> <p>M1</p> <p>A1</p>	<p>(1152 or 5.33...) 'FT their 4'</p> <p>FT 'their 4' for M2 or M1</p> <p>M1 for <math>0.9 \times \frac{1}{3} \times 24 \times 12^2</math> or <math>0.9 \times \frac{1}{3} \times 4 \times 2^2</math>; (1036.8 or 1037) (4.77 or 4.8)</p> <p>CAO</p> <p>Award for 1031.9(4) to 1032.3</p>
<p><b>Alternative Method 2 for first 6 marks (scaling the volume):</b></p> $\frac{1}{3} \times 24 \times 12^2$ $0.9 \times \frac{1}{3} \times 24 \times 12^2 \text{ or } \frac{1}{6^3} \left( \frac{1}{3} \times 24 \times 12^2 \right)$ $0.9 \left( \frac{1}{3} \times 24 \times 12^2 - \frac{1}{6^3} \left( \frac{1}{3} \times 24 \times 12^2 \right) \right) \text{ oe}$ <p>1032 (grams)</p>	<p>M1</p> <p>M1</p> <p>M3</p> <p>A1</p>	<p>(=1152)</p> <p>(1036.8 or 1037) or (4.77 or 4.8)</p> <p>or M2 for sight of  <math>\frac{1}{3} \times 24 \times 12^2 - \frac{1}{6^3} \left( \frac{1}{3} \times 24 \times 12^2 \right) \text{ oe}</math>          or M1 for sight of <math>\frac{1}{6^3} \left( 0.9 \times \frac{1}{3} \times 24 \times 12^2 \right) \text{ oe}</math></p> <p>CAO</p> <p>Award for 1031.9(4) to 1032.3</p>

15.(b) Valid impact following their assumption e.g. 'The volume of the wax may be a little less so the mass will be less.' or 'The density of the wick is likely to be less than the density of the wax, so in fact the mass of the candle is likely to be a bit less.'	E1	Must have stated an assumption in part (a).
	(8)	
16. $\frac{\text{smallest miles}}{\text{greatest litres}}$ oe $187.25 \div 5 (= 37.45)$ Correct unit conversion 59.92 (km/l)	S1 M2 B1 A1	Allow $187 \leq d < 187.5$ and $4.8 < l \leq 5.2$ M1 for one value correct in a division At some stage; e.g. $299.6 \div 5$ implies S1 M2 B1 CAO; allow an answer of 60 from correct working only.  If many attempts are offered without a method or answer being identified, then mark final attempt
	(5)	
17.(a) 40 320	B2	B1 for sight of 8! or equivalent product
17.(b) 10 080	B2	B1 for sight of $4 \times 7 \times 6 \times 5 \times 4 \times 3$ or equivalent
	(4)	
18.(a) 0 (cm per year)	B1	
18.(b) Gradient of the chord joining (10, 145) to (15, 168) $\frac{168 - 145}{15 - 10}$ 4.6 (cm per year)	M2 A1	M1 for the gradient of a chord with one point correct CAO
	(4)	

<p>19.</p> $7(x+2)+4(3x+1)=(3x+1)(x+2)$ <p>Expands the brackets and collects all terms on one side:</p> $7x+14+12x+4=3x^2+6x+x+2$ $3x^2-12x-16=0$ <p>Applies the quadratic formula:</p> $\frac{-(-12) \pm \sqrt{(-12)^2 - 4(3)(-16)}}{2 \times 3} \text{ or better}$ <p>Simplifies:</p> $\frac{12 \pm \sqrt{336}}{6} \text{ or } \frac{6 \pm 2\sqrt{21}}{3} \text{ or equivalent}$ <p>-1.06, 5.06</p>	<p>M2</p> <p>M1</p> <p>M2</p> <p>M1</p> <p>A1</p> <p>A1</p> <p>(7)</p>	<p>soi</p> <p>M1 for <math>\frac{7(x+2)+4(3x+1)}{(3x+1)(x+2)} (=1)</math> soi</p> <p>FT for possible M2 or M1 here, only if of equivalent difficulty; For M2 and M1 allow one error in expansion or collection;</p> <p>M1 for expansion not equated to zero e.g. <math>7x + 14 + 12x + 4 = 3x^2 + 6x + x + 2</math> leading to 'their <math>19x + 18</math>' = 'their <math>3x^2 + 7x + 2</math>'</p> <p>FT 'their derived 3-term quadratic' (even if it does not result in real roots); allow one slip in substitution; formula must not be clearly incorrect; allow attempt to complete the square with at most one slip</p> <p>FT 'their derived 3-term quadratic'; may be implied by correct decimal values -1.05505..., 5.05505...</p> <p>CAO</p>
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20.(a) Correct justification e.g. $360 - 150 - 161 (= 49^\circ)$ or $180 - 161 + 30 (= 49^\circ)$	B1	or equivalent; check diagram; NB method must be seen as answer is given Allow $30 + 19 (= 49)$
20.(b) $\frac{1}{2} \times 50 \times 72 \times \sin 49$ 1358(.4772...km <sup>2</sup> )	M1  A1	
20.(c) $PR^2 = 2960(.37\dots)$ $PR = 54.4(\dots \text{ km})$ $\cos PRQ = \frac{54.4^2 + 72^2 - 50^2}{2 \times 54.4 \dots \times 72}$ or $\sin PRQ = 50 \times \frac{\sin 49}{54.4 \dots}$ or $\cos QPR = \frac{54.4^2 + 50^2 - 72^2}{2 \times 54.4 \dots \times 72}$ or $\sin QPR = 72 \times \frac{\sin 49}{54.4 \dots}$ $PRQ = 44^\circ$ or $QPR = 87^\circ$ Bearing is $(360 - 44 - 19 = ) 297^\circ$ or $(180 + 30 + 87 = ) 297^\circ$	M2 A1 M2 A1 A1 A1	M1 for $PR^2 = 50^2 + 72^2 - 2(50)(72)\cos 49$ soi; accept 54 km FT 'their 54.4....' for M2 or M1 M1 for $50^2 = 54.4 \dots^2 + 72^2 - 2(54.4 \dots)(72)\cos PRQ$ or for $\frac{\sin PRQ}{50} = \frac{\sin 49}{54.4 \dots}$ soi; may be inverted or for $72^2 = 54.4 \dots^2 + 50^2 - 2(54.4 \dots)(72)\cos QPR$ or for $\frac{\sin QPR}{72} = \frac{\sin 49}{54.4 \dots}$ soi; may be inverted CAO; Accept 43.9(...) or 87.0(...) FT 'their derived 44' or 'their derived 87'
<b>Alternative method using area</b> $PR^2 = 2960(.37\dots)$ $PR = 54.4(\dots \text{ km})$ $\sin QRP = \frac{1358 \times 2}{54.4 \dots \times 72}$ or $\sin QPR = \frac{1358 \times 2}{54.4 \dots \times 50}$ $PRQ = 44^\circ$ or $QPR = 87^\circ$ Bearing is $(360 - 44 - 19 = ) 297^\circ$ or $(180 + 30 + 87 = ) 297^\circ$	M2 A1 M2 A1 A1	M1 for $PR^2 = 50^2 + 72^2 - 2(50)(72)\cos 49$ soi; accept 54 km FT 'their 1358' and 'their 54.4....' for M2 or M1 M1 for $\frac{1}{2} \times 54.4 \dots \times 72 \times \sin QRP = 1358$ or for $\frac{1}{2} \times 54.4 \dots \times 50 \times \sin QPR = 1358$ CAO; Accept 43.9(...) or 87.0(...) FT 'their derived 44' or 'their derived 87'
	(10)	

<p>21.(a) Correctly completed Venn diagram e.g. (<math>\varepsilon</math>)</p>  <p>or <math>0.12 + 0.42</math> or <math>0.3 + 0.6 - 2(0.18)</math> or equivalent</p> <p>0.54</p>	<p>B2</p> <p>B1</p>	<p>B1 for sight of a correct method to find the intersection e.g. <math>0.3 + 0.6 - 0.72</math> or <math>0.3 - x + x + 0.6 - x = 0.72</math> or sight of 0.18</p> <p>FT 'their <math>0.12 + 0.42</math>' or <math>0.3 + 0.6 - 2</math>('their 0.18'); correct answer implies B2 B1</p>
<p>21.(b) <math>1 - P(A \cup B)</math> or equivalent or correct region on Venn diagram indicated</p> <p>0.28</p>	<p>S1</p> <p>B1</p> <p>(5)</p>	<p>implies S1 FT 'their Venn diagram'</p>