

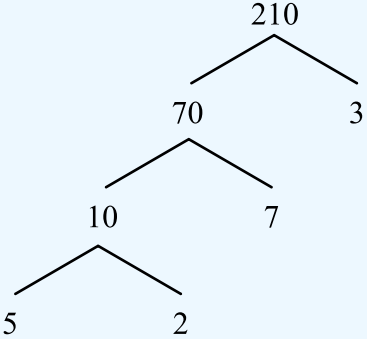


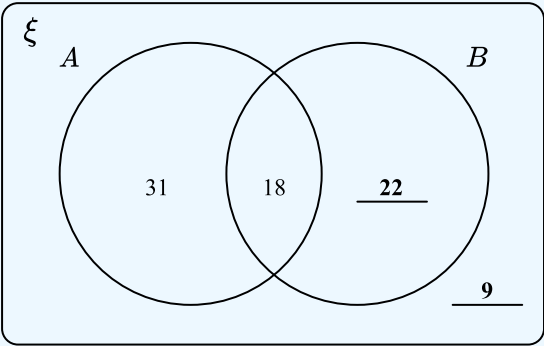
THIRD SPACE
LEARNING

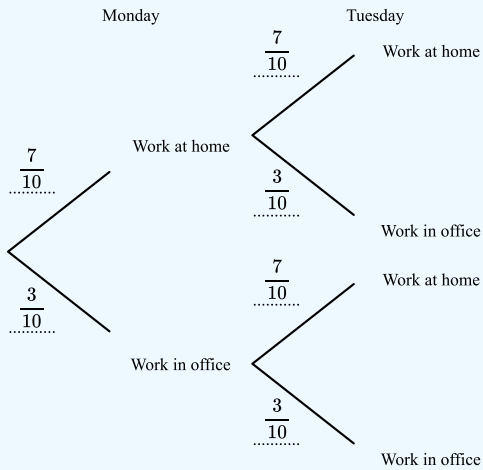
Mathematics
Paper 5
(Non-Calculator)
Higher Tier
Mark Scheme

OCR GCSE

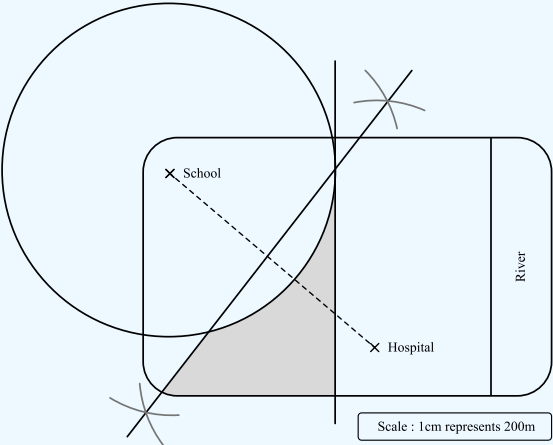
SET 5

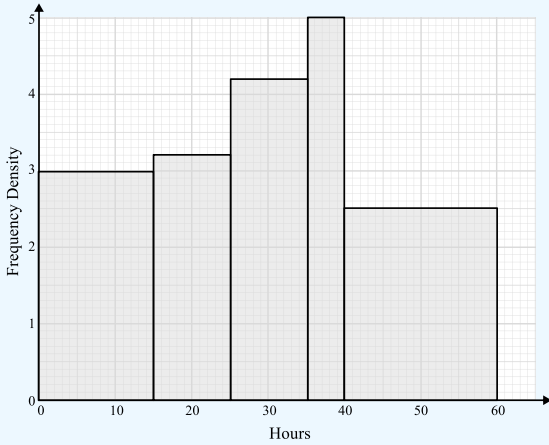
Question	Working	Answer	Notes
Q1a		0.72	
Q1b		$\frac{12}{7}$	B1 oe
Q1c	$\frac{4}{5} = 0.8$ $(4.1 - 0.8) \div 11 = 3.3 \div 11$ $= 0.3$	0.3	B1 $\frac{4}{5} = 0.8$ M1 $(4.1 - "0.8") \div 11$ oe A1 cao
Q2	$\frac{39.4 + 4.7}{\sqrt{99.7}} \simeq \frac{40 + 5}{\sqrt{100}} = \frac{45}{10} = 4.5$	4.5	M1 Correctly rounds all values to 1sf A1 cao
Q3		$2 \times 3 \times 5 \times 7$	M1 Correct prime factors identified A1 cao
Q4	$3.15 \times 10^4 = 31500$ $3.15 \times 10^{-2} = 0.0315$ $3.15 \times 10^{-1} = 0.315$ 3150 0.0315, 0.315, 3150, 31500	3.15×10^{-2} , 3.15×10^{-1} , 3150, 3.15×10^4	M1 Correctly converts at least two values A1 cao

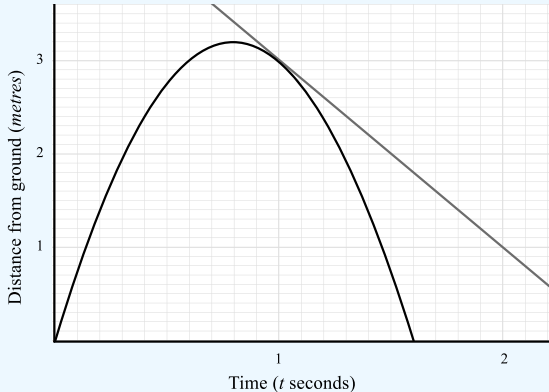
Question	Working	Answer	Notes
Q5	$360 = 60\%$ $60 = 10\%$ $600 = 100\%$	£600	M1 $360 = 60\%$ seen or implied A1 cao
Q6a		$\begin{pmatrix} 7 \\ 7 \end{pmatrix}$	
Q6b	$\begin{pmatrix} -3 & -2 \\ 7 & -6 \end{pmatrix} = \begin{pmatrix} -5 \\ 1 \end{pmatrix}$	$\begin{pmatrix} -5 \\ 1 \end{pmatrix}$	M1 $-3 - 2 \times 1$ or $7 - 2 \times 3$ A1 cao
Q7a			M1 $40 - 18 = 22$ A1 Both values correct
Q7b		$\frac{18}{80}$	
Q7c		$\frac{31}{49}$	M1 Either numerator or denominator correct A1 cao

Question	Working	Answer	Notes
<p>Q8</p>	<p>Pentagon: $\frac{3 \times 180}{5} = 108$</p> <p>Triangle: $\frac{180}{3} = 60$</p> <p>$108 + 60 + 60 = 228$</p> <p>$360 - 228 = 132$</p>		<p>M1 Interior angle of pentagon = 108</p> <p>M1 $108 + 108 + 60 = 228$</p> <p>A1 Full solution with no errors</p>
<p>Q9</p>	<p>Area A: $\pi \times (\sqrt{13})^2 = 13\pi$</p> <p>Area B: $\frac{1}{3} \times \pi \times 6^2 = 12\pi$</p>	<p>A</p>	<p>M1 $\pi \times (\sqrt{13})^2$ or $\pi \times 6^2$</p> <p>M1 Correctly squares $\sqrt{13}$ and reaches 13π</p> <p>M1 Divides 36π by 3 to get 12π</p> <p>A1 Correct answer from correct working</p>
<p>Q10a</p>	<p>$p \times p = \frac{49}{100}$</p> <p>$p = \sqrt{\frac{49}{100}} = \frac{7}{10}$</p> 		<p>M1 $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$</p> <p>M1 $P(\text{work in office}) = \frac{3}{10}$</p> <p>A1 Correctly completed tree diagram</p>

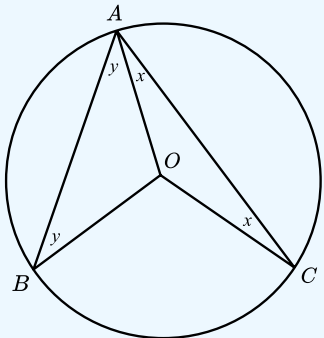
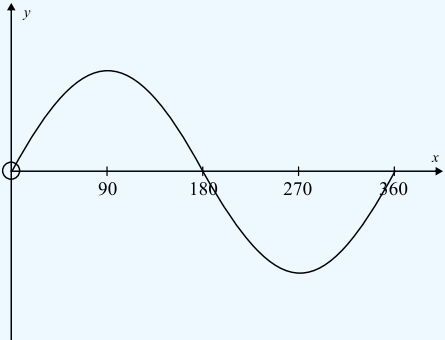
Question	Working	Answer	Notes
<p>Q10b</p>	$P(\text{office, home}): \frac{3}{10} \times \frac{7}{10} = \frac{21}{100}$ $P(\text{home, office}): \frac{7}{10} \times \frac{3}{10} = \frac{21}{100}$ $\frac{21}{100} + \frac{21}{100} = \frac{42}{100}$	$\frac{42}{100}$ oe	<p>M1 for a correct probability for one day (e.g. “$\frac{3}{10}$” × “$\frac{7}{10}$” or “$\frac{7}{10}$” “$\frac{3}{10}$”) ft their value for p in pt (a) M1 ft their “$\frac{21}{100}$” × 2 A1 cao</p>
<p>Q11a</p>	$\frac{5^5 \times 5^{-2}}{5} = \frac{5^3}{5} = 5^2 = 25$	<p>25</p>	<p>M1 Numerator simplified to 5^3 A1 cao</p>
<p>Q11b</p>		$\frac{1}{8}$	
<p>Q11c</p>	$\left(\frac{9}{49}\right)^{\frac{1}{2}} = \sqrt{\frac{9}{49}} = \frac{3}{7}$	$\frac{3}{7}$	<p>M1 Attempt square root (can be implied by sight of 3 or 7 correctly placed in their fraction) A1 cao</p>
<p>Q12</p>	$x^2 - 3x + 10 = 0$ $(x - 5)(x + 2) = 0$ $x = 5 \text{ or } x = -2$	$x = 5 \text{ or } x = -2$	<p>M1 Makes = 0 M1 Factorises correctly A1 both solutions correct</p>


Question	Working	Answer	Notes														
<p>Q13</p>	 <p>Scale : 1cm represents 200m</p>		<p>M1 Circle or arc, radius 4.5cm around the school M1 Perpendicular bisector of line between hospital and school constructed M1 Straight line 3cm from river A1 Correct area shaded</p>														
<p>Q14a</p>	<table border="1" data-bbox="286 724 846 782"> <tr> <td>Area of cross-section</td> <td>1</td> <td>2</td> <td>3</td> <td>6</td> <td>12</td> <td>18</td> </tr> <tr> <td>Length</td> <td>18</td> <td>9</td> <td>6</td> <td>3</td> <td>1.5</td> <td>1</td> </tr> </table>	Area of cross-section	1	2	3	6	12	18	Length	18	9	6	3	1.5	1		<p>B2 All correct (B1 At least 3 correct)</p>
Area of cross-section	1	2	3	6	12	18											
Length	18	9	6	3	1.5	1											
<p>Q14b</p>		<p>18cm³</p>															
<p>Q14c</p>	<p>Length = 2, so area of cross-section = 9 Side length, x = 3cm Surface area = 2 × 9 + 4 × 3 × 2 = 42cm²</p>	<p>42cm²</p>	<p>B1 Area of cross-section = 9 M1 x = 3cm M1 Surface area = 2 × 9 + 4 × 3 × 2 A1 cao</p>														
<p>Q15a</p>	<p>$\frac{14}{25} = \frac{56}{100} = 56\%$</p>	<p>No</p>	<p>M1 Sight of $\frac{14}{25}$ oe M1 56% correctly calculated A1 Correct conclusion from correct working</p>														
<p>Q15b</p>	<p>18 = 3 parts 6 = 1 part 6 × 14 = 84</p>	<p>84</p>	<p>M1 18 ÷ 3 A1 cao</p>														

Question	Working	Answer	Notes
<p>Q16a</p>		<p>Frequency densities: 3, 3.2, 4.2, 5, 2.5</p>	<p>M1 At least 4 correct frequency densities M1 Appropriate scale on axes A1 Correct histogram</p>
<p>Q16b</p>	$5 \times 4.2 + 5 \times 5 = 46$	$\frac{46}{194}$	<p>M1 5×4.2 seen or implied A1 $\frac{46}{194}$ oe</p>
<p>Q17</p>	$0.688... - 0.122... = 0.566...$ $x = 0.566...$ $10x = 5.666... \text{ or } 100x = 56.666... \text{ oe}$ $9x = 5.1 \text{ or } 90x = 51 \text{ oe}$ $x = \frac{51}{90} = \frac{17}{30}$	$\frac{17}{30}$	<p>M1 $0.688... - 0.122... = 0.566...$ M1 Multiplies 0.56666666 by power of 10 M1 Reaches $\frac{51}{90}$ A1 Correct simplified fraction</p>
<p>Q18a</p>	$y = kx^2$ $36 = k \times 100$ $k = 0.36$ $y = 0.36 \times 3^2 = 0.36 \times 9 = 3.24$	<p>3.24</p>	<p>M1 $36 = k \times 100$ M1 $y = 0.36 \times x^2$ seen or implied A1 cao</p>
<p>Q18b</p>		<p>50%</p>	

Question	Working	Answer	Notes
<p>Q19a</p>	$\frac{1}{2} (24 + 30) 25$ $= 27 \times 25$ $= 675$	<p>675m</p>	<p>M1 Attempts to find area</p> <p>M1 $\frac{1}{2} (24 + 30) \times 25$ or</p> <p>$\frac{1}{2} \times 6 \times 25 + 24 \times 25$</p> <p>A1 cao</p>
<p>Q19bi</p>	 <p>Distance from ground (metres)</p> <p>Time (t seconds)</p> $\text{Gradient} = \frac{1 - 3}{2 - 1} = -2$	<p>-2</p>	<p>M1 Tangent drawn</p> <p>M1 Calculates gradient of their tangent</p> <p>A1 Answer in range -2.3 to -1.7</p>
<p>Q19bii</p>		<p>The gradient represents the speed in m/s at the time $t = 1$</p>	<p>B1 The speed</p> <p>B1 Any of 'in m/s', 'at the time $t = 1$' or 'when the distance is 3' oe</p>

Question	Working	Answer	Notes
Q20	$r = \frac{7(2p+1)}{5p-3}$ $r(5p-3) = 7(2p+1)$ $5pr - 3r = 14p + 7$ $5pr - 14p = 7 + 3r$ $p(5r - 14) = 7 + 3r$ $p = \frac{7 + 3r}{5r - 14}$	$p = \frac{7 + 3r}{5r - 14}$	M1 Multiplies by $5p - 3$ M1 Expands and attempts to move p terms to one side M1 Factorises A1 $p = \frac{7 + 3r}{5r - 14}$ oe
Q21	$5x + 10y = 210$ $x = 5y$ $25y + 10y = 210$ $35y = 210$ $y = 6$ $x = y \times 6 = 30$	30 5p coins 6 10p coins	M1 Attempts 2 equations A1 2 correct equations M1 Attempts to solve equations A1 cao
Q22	$r = 2\sqrt{3}$ $12\sqrt{3} \times 2\sqrt{3}$	72	

Question	Working	Answer	Notes
Q23	 <p> Angle $OAC = \text{angle } OCA = x$ Angle $OAB = \text{angle } OBA = y$ Angle $BAC = x + y$ Angle $AOC = 180 - 2x$ Angle $AOB = 180 - 2y$ Angle BOC $= 360 - (180 - 2x) - (180 - 2y)$ $= 2x + 2y$ $= 2 \times \text{angle } BAC$ </p>		<p> M1 Splits into 2 isosceles triangles and identifies that Angle $OAC = \text{angle } OCA$ and Angle $OAB = \text{angle } OBA$ M1 Finds expressions for AOB and AOC M1 Finds expression for BOC A1 Correctly compares to BAC. Must follow fully correct working </p>
Q24a			<p> M1 Shape correct A1 All points of intersection with axes correct and -1 and 1 labelled </p>


Question	Working	Answer	Notes
Q24b		$\sin(x) = \tan(x)$ for 3 values of x	
Q25	$x^2 - 3 < 5x - x^2$ $2x^2 - 5x - 3 < 0$ $(2x + 1)(x - 3) < 0$ $-\frac{1}{2} < x < 3$ $5x - x^2 < x + 3$ $x^2 - 4x + 3 > 0$ $(x - 3)(x - 1) > 0$ $x < 1 \text{ or } x > 3$ 	$-\frac{1}{2} < x < 1$	<p>M1 Attempts to solve $f(x) < g(x)$, rearranges to get $2x^2 - 5x - 3 < 0$</p> <p>M1 Valid method to solve $2x^2 - 5x - 3 < 0$ e.g. factorising to $(2x + 1)(x - 3)$ or correct substitution into quadratic formula. Don't be concerned with incorrect inequality signs or = signs at this point</p> <p>M1 Valid method to solve $x^2 - 4x + 3 > 0$ e.g. $(x + 3)(x - 1)$ or correct substitution into quadratic formula. Don't be concerned with incorrect inequality signs or = signs at this point</p> <p>M1 $-\frac{1}{2} < x < 3$ or $x < 1, x > 3$ seen</p> <p>A1 cao</p>

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