



THIRD SPACE
LEARNING

Mathematics

Paper 1

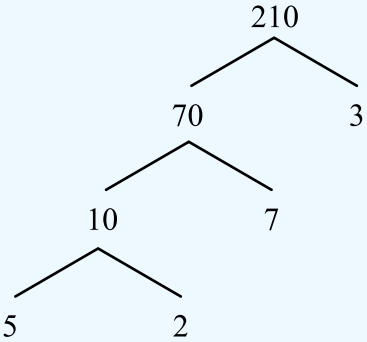
(Non-Calculator)

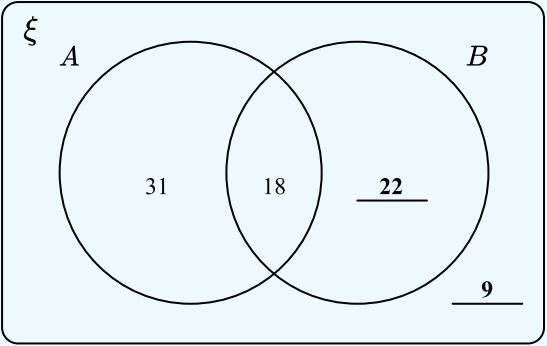
Higher Tier

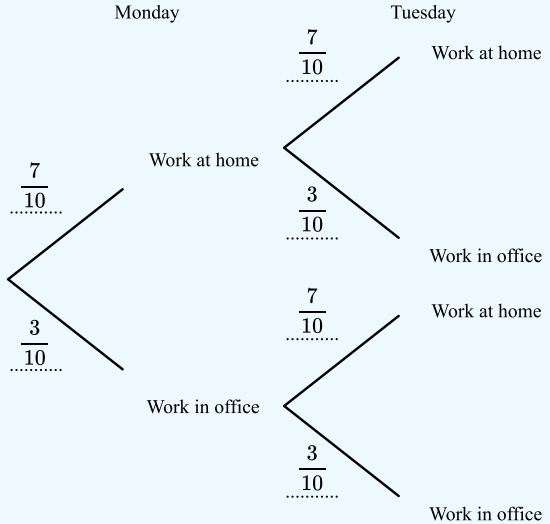
Mark Scheme

AQA GCSE

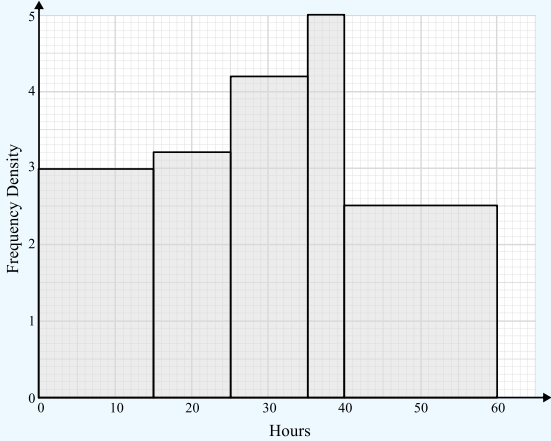
SET 5

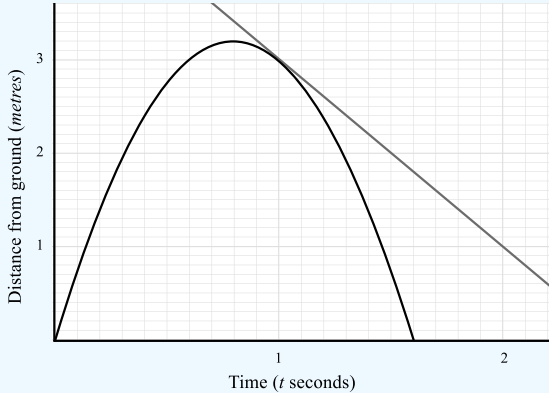
Question	Working	Answer	Notes
Q1a		0.72	
Q1b		$\frac{12}{7}$	B1 oe
Q2		$2 \times 3 \times 5 \times 7$	M1 Correct prime factors identified A1 cao
Q3	$3.15 \times 10^4 = 31500$ $3.15 \times 10^{-2} = 0.0315$ $3.15 \times 10^{-1} = 0.315$ 3150 0.0315, 0.315, 3150, 31500	3.15×10^{-2} , 3.15×10^{-1} , 3150, 3.15×10^4	M1 Correctly converts at least two values A1 cao
Q4	$360 = 60\%$ $60 = 10\%$ $600 = 100\%$	£600	M1 $360 = 60\%$ seen or implied A1 cao

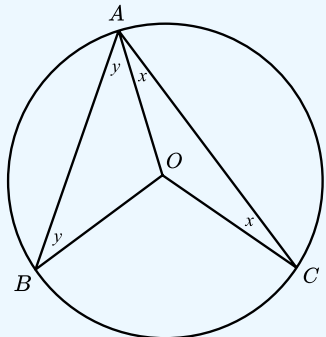
Question	Working	Answer	Notes
Q5a			<p>M1 $40 - 18 = 22$ A1 Both values correct</p>
Q5b		$\frac{18}{80}$	
Q6	<p>Pentagon: $\frac{3 \times 180}{5} = 108$</p> <p>Triangle: $\frac{180}{3} = 60$</p> <p>$108 + 60 + 60 = 228$</p> <p>$360 - 228 = 132$</p>		<p>M1 Interior angle of pentagon = 108 M1 $108 + 108 + 60 = 228$ A1 Full solution with no errors</p>
Q7	<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 $\pi \times 6^2$ M1 Correctly squares $\sqrt{13}$ and reaches 13π M1 Divides 36π by 3 to get 12π A1 Correct answer from correct working</p>

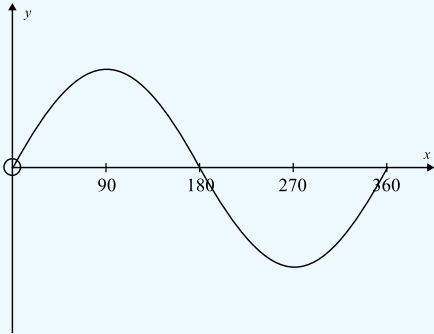
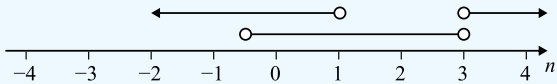
Question	Working	Answer	Notes
<p>Q8a</p>	$p \times p = \frac{49}{100}$ $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$ 		<p>M1 $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$</p> <p>M1 $P(\text{work in office}) = \frac{3}{10}$</p> <p>A1 Correctly completed tree diagram</p>
<p>Q8b</p>	$P(\text{office, home}): \frac{3}{10} \times \frac{7}{10} = \frac{21}{100}$ $P(\text{home, office}): \frac{7}{10} \times \frac{3}{10} = \frac{21}{100}$ $\frac{21}{100} + \frac{21}{100} = \frac{42}{100}$	$\frac{42}{100} \text{ oe}$	<p>M1 for a correct probability for one day (e.g. “$\frac{3}{10}$” × “$\frac{7}{10}$” or “$\frac{7}{10}$” “$\frac{3}{10}$”)</p> <p>ft their value for p in pt (a)</p> <p>M1 ft their “$\frac{21}{100}$” × 2</p> <p>A1 cao</p>

Question	Working	Answer	Notes														
Q9a	$\frac{5^5 \times 5^{-2}}{5} = \frac{5^3}{5} = 5^2 = 25$	25	M1 Numerator simplified to 5^3 A1 cao														
Q9b		$\frac{1}{8}$															
Q10	$x^2 - 3x + 10 = 0$ $(x - 5)(x + 2) = 0$ $x = 5$ or $x = -2$	$x = 5$ or $x = -2$	M1 Makes = 0 M1 Factorises correctly A1 both solutions correct														
Q11a	<table border="1" data-bbox="286 726 846 783"> <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		B2 All correct (B1 At least 3 correct)
Area of cross-section	1	2	3	6	12	18											
Length	18	9	6	3	1.5	1											
Q11b		18cm^3															
Q11c	Length = 2, so area of cross-section = 9 Side length, $x = 3\text{cm}$ Surface area = $2 \times 9 + 4 \times 3 \times 2$ = 42cm^2	42cm^2	B1 Area of cross-section = 9 M1 $x = 3\text{cm}$ M1 Surface area = $2 \times 9 + 4 \times 3 \times 2$ A1 cao														
Q12	$\frac{14}{25} = \frac{56}{100} = 56\%$	No	M1 Sight of $\frac{14}{25}$ oe M1 56% correctly calculated A1 Correct conclusion from correct working														

Question	Working	Answer	Notes
<p>Q13a</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>Q13b</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>Q14</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>Q15</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>

Question	Working	Answer	Notes
<p>Q16a</p>	 <p>Gradient = $\frac{1 - 3}{2 - 1} = -2$</p>	<p>-2</p>	<p>M1 Tangent drawn M1 Calculates gradient of their tangent A1 Answer in range -2.3 to -1.7</p>
<p>Q16b</p>		<p>The gradient represents the speed in <i>m/s</i> at the time $t = 1$</p>	<p>B1 The speed B1 Any of ‘in <i>m/s</i>’, ‘at the time $t = 1$’ or ‘when the distance is 3’ oe</p>
<p>Q17</p>	$r = \frac{7(2p + 1)}{5p - 3}$ $r(5p - 3) = 7(2p + 1)$ $5pr - 3r = 14p + 7$ $5pr - 14p = 7 + 3r$ $p(5r - 14) = 7 + 3r$ $p = \frac{7 + 3r}{5r - 14}$	$p = \frac{7 + 3r}{5r - 14}$	<p>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</p>

Question	Working	Answer	Notes
Q18	$5x + 10y = 210$ $x = 5y$ $25y + 10y = 210$ $35y = 210$ $y = 6$ $x = y \times 6 = 30$	30 5p coins 6 10p coins	M1 Attempts 2 equations A1 2 correct equations M1 Attempts to solve equations A1 cao
Q19	$r = 2\sqrt{3}$ $12\sqrt{3} \times 2\sqrt{3}$	72	
Q20	 <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>		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


Question	Working	Answer	Notes
<p>Q21a</p> 			<p>M1 Shape correct A1 All points of intersection with axes correct and -1 and 1 labelled</p>
<p>Q21b</p>		<p>$\sin(x) = \tan(x)$ for 3 values of x</p>	
<p>Q22a</p>	<p>$h^{-1}(x) = x - 3$ $h^{-1}(7) = 7 - 3 = 4$</p>	<p>4</p>	
<p>Q22b</p>	<p>$f(x) < g(x)$ $x^2 - 3 < 5x - x^2$ $2x^2 - 5x - 3 < 0$ $(2x + 1)(x - 3) < 0$ $-\frac{1}{2} < x < 3$</p> <p>$g(x) < h(x)$ $5x - x^2 < x + 3$ $x^2 - 4x + 3 > 0$ $(x - 3)(x - 1) > 0$ $x < 1$ or $x > 3$</p> 	<p>$-\frac{1}{2} < x < 1$</p>	<p>M1 Attempts to solve $f(x) < g(x)$, rearranges to get $2x^2 - 5x - 3 < 0$ 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 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 M1 $-\frac{1}{2} < x < 3$ or $x < 1, x > 3$ seen A1 cao</p>

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