



THIRD SPACE
LEARNING

Mathematics

Paper 1

(Non-Calculator)

Higher Tier

Mark Scheme

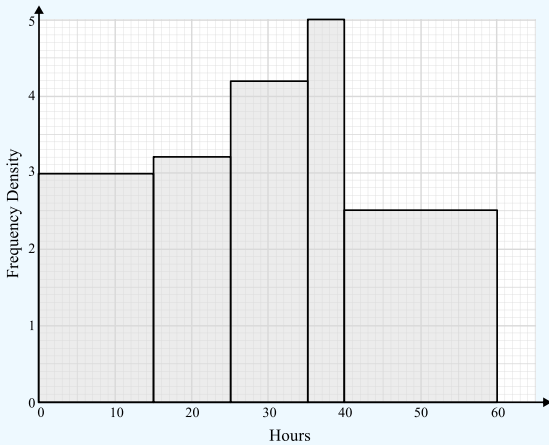
Edexcel GCSE

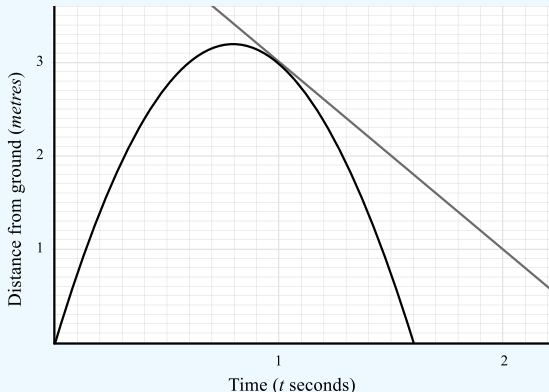
SET 5

Question	Working	Answer	Notes
Q1a	$ \begin{array}{c} 210 \\ \swarrow \quad \searrow \\ 70 \qquad 3 \\ \swarrow \quad \searrow \\ 10 \qquad 7 \\ \swarrow \quad \searrow \\ 5 \qquad 2 \end{array} $	$2 \times 3 \times 5 \times 7$	M1 Correct prime factors identified A1 cao
Q1b	$90 = 2 \times 3 \times 3 \times 5$ $210 = 2 \times 3 \times 5 \times 7$ $HCF = 2 \times 3 \times 5 = 30$	30	M1 Compares prime factors of 90 and 210 or attempts to list the factors of 90 and 210 A1 cao
Q2a		5, 7, 8, 9, 10, 11	
Q2b	$n(A \cap B) = 3$ $n(\xi) = 12$ $\frac{3}{12} = \frac{1}{4}$	$\frac{3}{12}$	M1 $n(A \cap B) = 3$ seen or implied A1 $\frac{3}{12}$ oe
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

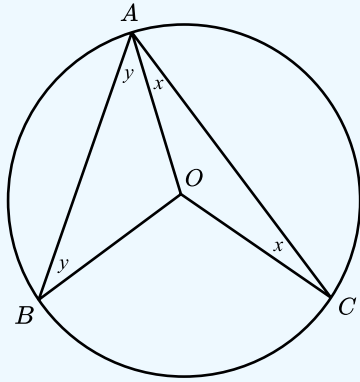
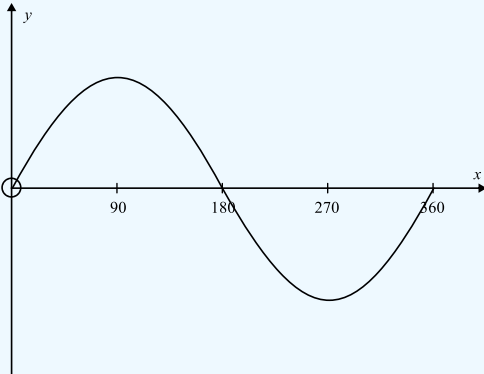
Question	Working	Answer	Notes
Q4	$\frac{7}{4} \times \frac{7}{3} = \frac{49}{12} = 4\frac{1}{12}$	$4\frac{1}{12}$	M1 Correctly converts both to improper fractions A1 cao
Q5	$360 = 60\%$ $60 = 10\%$ $600 = 100\%$	£600	M1 $360 = 60\%$ seen or implied A1 cao
Q6	Pentagon: $\frac{3 \times 180}{5} = 108$ Triangle: $\frac{180}{3} = 60$ $108 + 60 + 60 = 228$ $360 - 228 = 132$		M1 Interior angle of pentagon = 108 M1 $108 + 108 + 60 = 228$ A1 Full solution with no errors
Q7a	$p \times p = \frac{49}{100}$ $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$ <p>Monday</p> <p>Tuesday</p> <p>Work at home</p> <p>Work in office</p> <p>Work at home</p> <p>Work in office</p>		M1 $p = \sqrt{\frac{49}{100}} = \frac{7}{10}$ M1 $P(\text{work in office}) = \frac{3}{10}$ A1 Correctly completed tree diagram

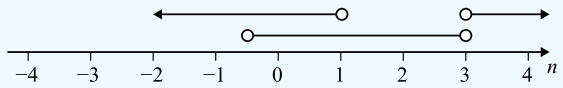
Question	Working	Answer	Notes														
Q7b	$\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10} = \frac{27}{1000}$	$\frac{27}{1000}$	M1 ft their $\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10}$ M1 $\frac{3}{10} \times \frac{3}{10} \times \frac{3}{10}$ A1 cao														
Q8a	$\frac{5^5 \times 5^{-2}}{5} = \frac{5^3}{5} = 5^2 = 25$	25	M1 Numerator simplified to 5^3 A1 cao														
Q8b		$\frac{1}{8}$															
Q8c	$\sqrt[3]{125} = 5$	5															
Q9	$x^2 - 3x + 10 = 0$ $(x - 5)(x + 2) = 0$ $x = 5$ or $x = -2$	$x = 5$ or $x = -2$	M1 Makes $= 0$ M1 Factorises correctly A1 both solutions correct														
Q10a	<table border="1"><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											
Q10b		18cm^3															
Q10c	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														

Question	Working	Answer	Notes
Q11	$\frac{14}{25} = \frac{56}{100} = 56\%$	No	M1 Sight of $\frac{14}{25}$ oe M1 56% correctly calculated A1 Correct conclusion from correct working
Q12a		Frequency densities: 3, 3.2, 4.2, 5, 2.5	M1 At least 4 correct frequency densities M1 Appropriate scale on axes A1 Correct histogram
Q12b	$5 \times 4.2 + 5 \times 5 = 46$	$\frac{46}{194}$	M1 5×4.2 seen or implied A1 $\frac{46}{194}$ oe
Q13	$0.688... - 0.122... = 0.566...$ $x = 0.566...$ $10x = 5.666... \text{ or } 100x = 56.666... \text{ oe}$ $9x = 5.1 \text{ or } 90x = 51 \text{ oe}$ $x = \frac{51}{90} = \frac{17}{30}$	$\frac{17}{30}$	M1 $0.688... - 0.122... = 0.566...$ M1 Multiplies 0.56666666 by power of 10 M1 Reaches $\frac{51}{90}$ A1 Correct simplified fraction

Question	Working	Answer	Notes
Q14	$y = kx^2$ $36 = k \times 100$ $k = 0.36$ $y = 0.36 \times 3^2 = 0.36 \times 9 = 3.24$	3.24	M1 $36 = k \times 100$ M1 $y = 0.36 \times x^2$ seen or implied A1 cao
Q15	 Gradient = $\frac{1-3}{2-1} = -2$	-2	M1 Tangent drawn M1 Calculates gradient of their tangent A1 Answer in range -2.3 to -1.7
Q16	$\frac{x}{360} \times 2 \times \pi \times 6 = 7\pi$ $\frac{12x}{360} = 7$ $\frac{x}{30} = 7$ $x = 210^\circ$ Area = $\frac{210}{360} \times \pi \times 6^2 = \frac{7}{12} \times \pi \times 36$ $= 21\pi$	$21\pi \text{ cm}^2$	M1 $\frac{x}{360} \times 2 \times \pi \times 6 = 7\pi$ A1 Angle = 210° M1 ft Area = $\frac{\text{“their 210”}}{360} \times \pi \times 6^2$ A1 cao

Question	Working	Answer	Notes
Q17	$r = \frac{7(2p+1)}{5p-3}$ $r(5p-3) = 7(2p+1)$ $5pr - 3r = 14p + 7$ $5pr - 14p = 7 + 3r$ $p(5r - 14) = 7 + 3r$ $p = \frac{7+3r}{5r-14}$	$p = \frac{7+3r}{5r-14}$	<p>M1 Multiplies by $5p - 3$</p> <p>M1 Expands and attempts to move p terms to one side</p> <p>M1 Factorises</p> <p>A1 $p = \frac{7+3r}{5r-14}$ oe</p>
Q18	$5x + 10y = 210$ $x = 5y$ $25y + 10y = 210$ $35y = 210$ $y = 6$ $x = y \times 6 = 30$	<p>30 5p coins</p> <p>6 10p coins</p>	<p>M1 Attempts 2 equations</p> <p>A1 2 correct equations</p> <p>M1 Attempts to solve equations</p> <p>A1 cao</p>

Question	Working	Answer	Notes
Q19	 <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 $OAB = \text{angle } OBA$</p> <p>M1 Finds expressions for AOB and AOC</p> <p>M1 Finds expression for BOC</p> <p>A1 Correctly compares to BAC.</p> <p>Must follow fully correct working</p>
Q20a			<p>M1 Shape correct</p> <p>A1 All points of intersection with axes correct and -1 and 1 labelled</p>

Question	Working	Answer	Notes
Q20b		45	
Q21a	$h^{-1}(x) = x - 3$ $h^{-1}(7) = 7 - 3 = 4$	4	
Q21b	$f(x) < g(x)$ $x^2 - 3 < 5x - x^2$ $2x^2 - 5x - 3 < 0$ $(2x + 1)(x - 3) < 0$ $-\frac{1}{2} < x < 3$ $g(x) < h(x)$ $5x - x^2 < x + 3$ $x^2 - 4x + 3 > 0$ $(x - 3)(x - 1) > 0$ $x < 1$ 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 $(2x \pm 1)(x \pm 3)$ 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. $(x \pm 3)(x \pm 1)$ 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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