



THIRD SPACE  
LEARNING

# Mathematics

## Paper 2

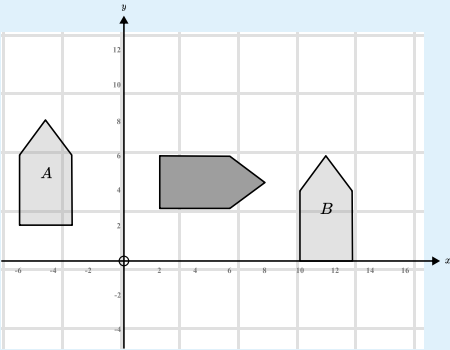
### (Calculator)

### Higher Tier

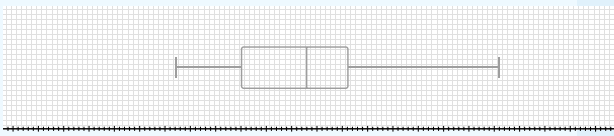
### Mark Scheme

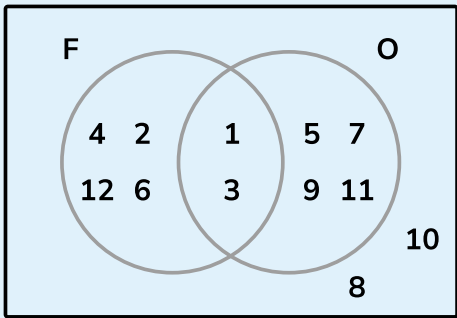
Edexcel GCSE

SET 1A

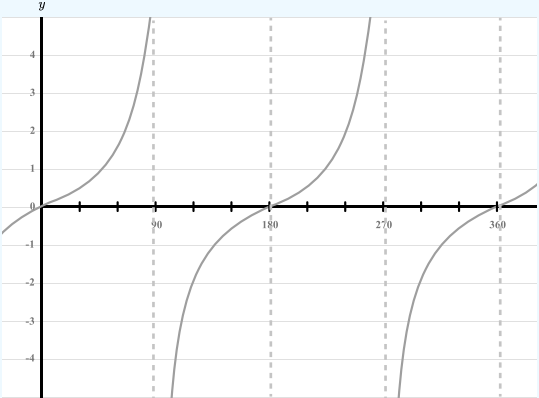
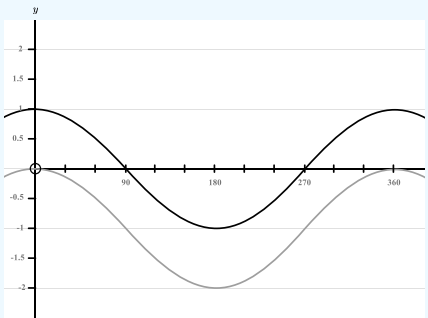
Question	Working	Answer	Notes
<b>Q1a</b>		3706.383333	B1 for 4.08900... or 3702.294... B1 cao
<b>Q1b</b>		3710	B1 cao
<b>Q2</b>	3 parts=27 employees $27 \div 3 = 9$ $5 + 8 = 13$ $9 \times 13 = 117$	117	M1 $27 \div 3 = 9$ A1 cao
<b>Q3a</b>	$150 \times 1.19 = \text{€}178.50$	€178.50	M1 $150 \times 1.19$ A1 cao condone €178.5
<b>Q3b</b>	$2 \times 10 + 2 \times 1.95 + 4.25 + 4.20 = \text{€}32.35$ $20 + 15 = \text{€}35$	Yes	M1 Correctly adding the value of the order A1 Yes with appropriate working seen
<b>Q4a</b>			M1 Any rotation of $90^\circ$ clockwise A1 cao

Question	Working	Answer	Notes
<b>Q4b</b>	Mark has counted the number of squares between the two shapes	No, correct answer is	A1 No A1 A correct explanation
<b>Q5a</b>	$21q + 15 - 6q + 8$	$15q + 23$	M1 21q, 15, 6q and 8 seen A1 cao
<b>Q5b</b>		$x(x+6)$	A1 cao
<b>Q5c</b>	$6x^2 + 9x - 10x - 15$	$6x^2 - x - 15$	M1 At least two correct of $6x^2 + 9x - 10x - 15$ A1 cao
<b>Q6a</b>	Area of whole garden: $14 \times 9 = 126\text{m}^2$ Area of patio: $4 \times 6 = 24\text{m}^2$ Area of summer house: $4 \times 2.5 = 10\text{m}^2$ $126 - 24 - 10 = 92\text{m}^2$	$92\text{m}^2$	M1 Two of the three areas correct M1 Subtracting their areas for patio and summerhouse from the total area A1 cao
<b>Q6b</b>	$92 \times 100 \times 100 = 920\,000\text{cm}^2$	$920\,000\text{cm}^2$	M1 Attempting to multiply by 100 twice A1 cao
<b>Q7</b>	10% of 12000=1200 12000-1200=£10800 10% of 10800=1080 10800-1080=£9720	£9720	M1 Value after one year £10800 or $12000 \times 0.9^2$ seen A1 cao
<b>Q8</b>	$\frac{12a^7b^3}{3a^2b^{-3}} = 4a^5b^6$	$4a^5b^6$	M1 $12a^7b^3$ seen A1 cao

Question	Working	Answer	Notes
<b>Q9a</b>	Ollie: $x$ , Tommy: $x + 12$ , Amber: $2x + 24$ $x + x + 12 + 2x + 24 = 136$ $4x + 36 = 136$	$4x + 36 = 136$	M1 Attempt to add expressions for all 3 students and put equal to 136 A1 cao
<b>Q9b</b>	$x = 25$	Ollie: 25 Tommy: 37 Amber: 74	M1 $x = 25$ A1 All 3 correct
<b>Q10</b>		$345 \leq \text{mass} < 355$	A1 345 A1 355
<b>Q11a</b>	LQ: 8.9, Median: 11.6, UQ: 13.1 Min value: 6.4, Max value 19.1 		M1 At least two of lower quartile, median and upper quartile correct M1 Highest and lowest values correctly marked on box plot A1 cao
<b>Q11b</b>	Median for A 11.6. Median for B 15.8. IQR for A is $13.1 - 8.9 = 4.2$ . IQR for B is $17.2 - 13.6 = 3.6$ .		B1 A statement comparing the median or highest/lowest values B1 A statement comparing range or interquartile range NOTE - For B2 at least one statement MUST be with context

Question	Working	Answer	Notes
<b>Q12a</b>	$y = 3x - 4$ $y = -\frac{3}{4}x + \frac{10}{4}$	$4y + 3x = 10$ and $y = 2 - \frac{3}{4}x$	M1 Attempting to rearrange at least one equation to find the gradient A1 cao
<b>Q12b</b>	$y = 5x + c$ $2 = 5 \times 2 + c$ $c = -3$	$y = 5x - 3$	M1 $y = 5x + c$ seen A1 cao
<b>Q13a</b>		$\xi$ 	M1 At least 8 values correctly placed A1 cao
<b>Q13b</b>		$\frac{2}{12}$	B1 oe
<b>Q13c</b>		$\frac{4}{6}$	M1 correct numerator or denominator A1 oe
<b>Q14a</b>	$y = \frac{k}{\sqrt{x}}$ $30 = \frac{k}{\sqrt{25}}$ $k = 30 \times 5 = 150$ $y = \frac{150}{\sqrt{16}} = 37.5$	37.5	M1 $k=150$ seen A1 cao
<b>Q14b</b>	$A = kB^2$ $A = k(2B)^2 = 4Bx^2$	Doubling B multiplies A by 4	B1 No B1 A valid explanation

Question	Working	Answer	Notes
<b>Q15</b>	$\frac{24}{N} = \frac{8}{30}$ $N = \frac{24 \times 30}{8} = 90$	90	M1 $\frac{24}{N} = \frac{8}{30}$ oe A1 cao
<b>Q16</b>	$x^2 - x - 20 \leq 0$ $(x + 4)(x - 5) \leq 0$ $-4 \leq x \leq 5$	$-4 \leq x \leq 5$	M1 Rearranging to $x^2 - x - 20 \leq 0$ M1 Correctly factorising A1 cao
<b>Q17</b>	$\frac{a}{\sin(47)} = \frac{10.2}{\sin(68)}$ $a = \frac{10.2}{\sin(68)} \times \sin(47) = 8.04566\dots$ $\cos(x) = \frac{12^2 + 10.5^2 - 8.04566\dots^2}{2 \times 12 \times 10.5} = 0.75205$ $x = \cos^{-1}(0.75205) = 41.2^\circ$	$47.2^\circ$	M1 $\frac{a}{\sin(47)} = \frac{10.2}{\sin(68)}$ oe A1 Side length: 8.04566... M1 Use of cosine rule to find angle A1 cao
<b>Q18a</b>	$y = 2x - 1$ $\frac{y + 1}{2} = x$ $g^{-1}(x) = \frac{x + 1}{2}$	$g^{-1}(x) = \frac{x + 1}{2}$	M1 Attempt to make 'y' the subject A1 cao
<b>Q18b</b>	$2(x^2 + 4) - 1$ $2x^2 + 7$	$g(x) = 2x^2 + 7$	M1 Substituting f into g A1 cao
<b>Q19a</b>	$180 - 138 = 42$ $42 \times 2 = 84^\circ$	$84^\circ$	M1 Angle ABC = $42^\circ$ A1 cao

Question	Working	Answer	Notes
<b>Q19b</b>	<p>Angle OFN <math>90^\circ</math> since a radius meets a tangent at <math>90^\circ</math></p> <p>Angle FON <math>180-90-x = 90-x</math> since angles in a triangle sum to 180</p> <p>Angle FOE <math>180-(90-x) = 90+x</math> since angles on a straight line sum to 180</p> <p>Angle FEO <math>\frac{1}{2}(180-(90+x)) = 45 - \frac{1}{2}x</math> since it is isosceles</p>		<p>M1 Correct working to get to <math>45 - \frac{1}{2}x</math></p> <p>B1 At least two valid steps with reasons seen</p> <p>B1 Each step justified</p>
<b>Q20a</b>			B1 cao
<b>Q20b</b>			B1 cao

Question	Working	Answer	Notes
Q20c		(180, -2)	<b>B1</b> x or y coordinate correct <b>B1</b> cao
Q21a	<b>Volume of cylinder:</b> $\pi r^2 \times 0.1$ <b>Volume of hemisphere:</b> $\frac{1}{2} \times \frac{4}{3} \pi r^3$ <b>Total volume:</b> $0.1\pi r^2 + \frac{2}{3}\pi r^3 = \pi r^2(0.1 + \frac{2}{3}r)$		<b>M1</b> Volume of cylinder and volume of hemisphere correct <b>A1</b> Correct steps
Q21b	$Area = \frac{800}{2825} = 0.28318584$ $Radius = \sqrt{\frac{0.28318584}{\pi}} = 0.30023$ $Volume = \pi \times 0.30023^2(0.1 + \frac{2}{3} \times 0.30023)$ $Volume = 0.085m^3$	$0.085m^3$	<b>M1</b> Correctly calculating area <b>M1</b> Attempting to find the radius <b>M1</b> Substituting their value for radius into $V = \pi r^2(0.1 + \frac{2}{3}r)$ <b>A1</b> ca



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