



THIRD SPACE
LEARNING

Mathematics

Paper 2

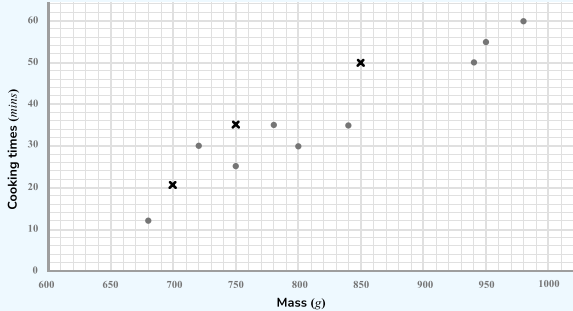
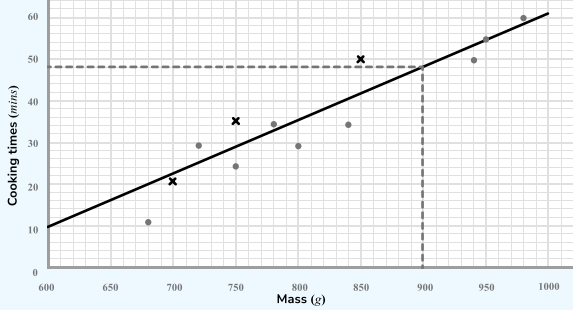
(Calculator)

Higher Tier

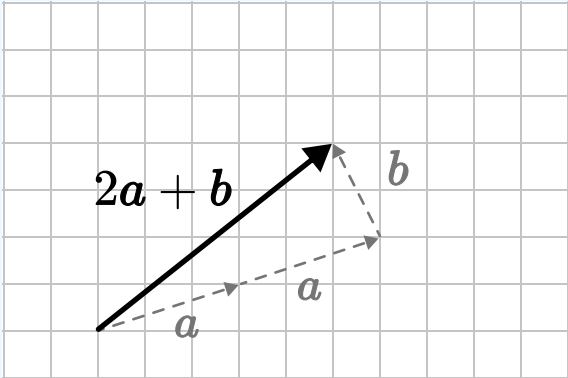
Mark Scheme

AQA GCSE

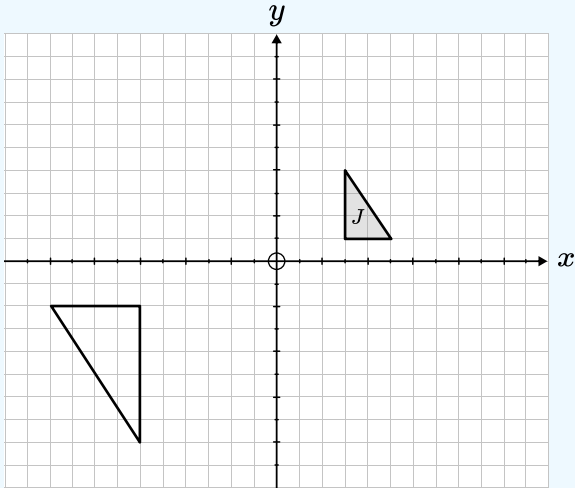
SET 2

Question	Working	Answer	Notes
Q1		Identity	B1 cao
Q2		C	B1 cao
Q3		SAS	B1 cao
Q4		2:5	B1 cao
Q5a			A1 All three points correct
Q5b			B1 Positive correlation
Q5c		48 minutes	A1 Answer in range 46 – 50 minutes

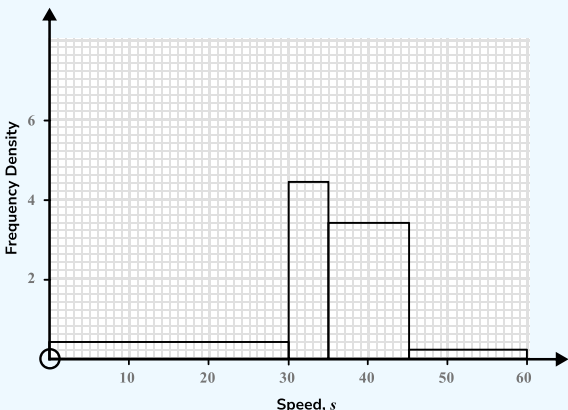
Question	Working	Answer	Notes
Q6	<p>Area of trapezium: $\frac{1}{2} \times (6 + 9) \times 4 = 30\text{cm}^2$</p> <p>40% of 30 = 12</p> <p>Area of rectangle = $30 + 12 = 42\text{cm}^2$</p> <p>$42 \div 4 = 10.5\text{cm}$</p>	10.5cm	<p>A1 Area of trapezium ($= 30\text{cm}^2$)</p> <p>M1 <i>ft</i> 40% of their area correct</p> <p>M1 Area of rectangle = 42cm^2</p> <p>A1 cao</p>
Q7	<p>$500 \div 5 = 100\text{g}$ to make 4 doughnuts</p> <p>$100 \times 3 = 300\text{g}$ to make 12 doughnuts</p> <p>$30 \times 4 = 1200\text{g}$ to make 4 boxes of doughnuts</p> <p>$1200\text{g} < 1.5\text{kg}$ so she has enough.</p>	Yes	<p>M1 Attempt to use proportion to find the amount for flour for 12 or 48 doughnuts</p> <p>M1 300g for 12 doughnuts</p> <p>M1 1200g or 1.2kg seen</p> <p>A1 Correct statement following correct working</p>
Q8	<p>$9a + 6b = 60$</p> <p>$8a - 6b = 25$</p> <p>$17a = 85$</p> <p>$a = 5$</p> <p>$3 \times 5 + 2b = 20$</p> <p>$15 + 2b = 20$</p> <p>$2b = 5$</p> <p>$b = 2.5$</p>	<p>$a = 5$</p> <p>$b = 2.5$</p>	<p>M1 Convert both equations to make coefficients of a or b equal and attempt to add or subtract equations (correct operation based on the equations)</p> <p>A1 $a = 5$ or $b = 2.5$</p> <p>A1 Both values correct</p>

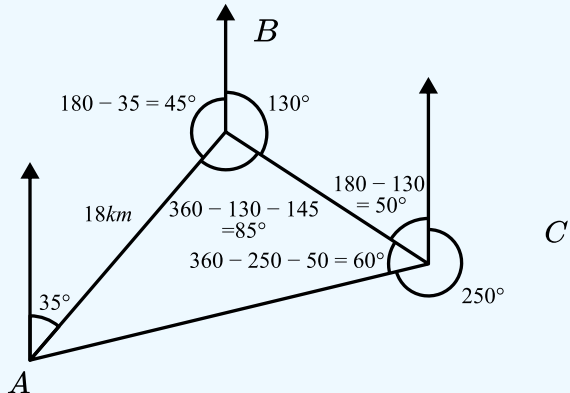
Question	Working	Answer	Notes
Q9	$AC^2 = 13^2 - 5^2 = 144$ $AC = 12cm$ $\tan(x) = \frac{12}{10}$ $x = \tan^{-1}\left(\frac{12}{10}\right)$ $x = 50.19442891$	50.2°	M1 $13^2 - 5^2$ seen or implied A1 $AC = 12cm$ M1 <i>ft</i> $\tan(x) = \frac{\text{their } AC}{10}$ oe A1 cao
Q10			M1 Vector a or b drawn on grid M1 Vector 2a seen or implied A1 Correct vector 2a + b Or M1 $2\begin{pmatrix} 3 \\ 1 \end{pmatrix} + \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ M1 $\begin{pmatrix} 5 \\ 4 \end{pmatrix}$ A1 Correct vector drawn
Q11	$5ny = 3m + 4$ $5ny - 4 = 3m$ $\frac{5ny - 4}{3} = m$	$m = \frac{5ny - 4}{3}$	M1 Correct first step A1 cao

Question	Working	Answer	Notes
Q12	$6 \times 350 = \text{£}2100$ $150 \times 2 \times 2 = \text{£}600$ $\text{£}2100 + \text{£}2400 + \text{£}600 = \text{£}5100$ $\text{£}5100 \div \text{£}1200 = 4.25$ $0.25 \text{ years} = 3 \text{ months}$	4 years 3 months	M1 $6 \times 350 = \text{£}2100$ M1 $\text{£}5100$ seen M1 Their total cost divided by $\text{£}1200$ A1 Correct answer in years and months
Q13a	$2.8 \div 3.5 \times 100 = \text{£}80$	$\text{£}80$	M1 Divide by 3.5 or by 0.035 A1 cao
Q13b	$\text{£}130 \times 1.035 \times 1.035 \times 1.035 = \text{£}144.13$	$\text{£}144.13$	M1 Attempt to increase by 3.5% three times using a compound method or 130×1.035^3 seen A1 cao
Q14	Izzy: probability is $\frac{1}{6}$ Jim: possible combinations are $1 + 5, 2 + 4, 3 + 3, 4 + 2$ and $5 + 1$. Jim: probability is $\frac{5}{36}$	Izzy is more likely to get a 6	M1 Probability for Izzy correct M1 5 combinations for Jim identified M1 $\frac{1}{6}$ and $\frac{5}{36}$ seen A1 Correct answer following correct working
Q15	Upper bound for one side is 3.85cm $5 \times 3.85 = 19.25\text{cm}$	19.25cm	M1 Upper bound for one side 3.85cm A1 cao

Question	Working	Answer	Notes
Q16	Katie: $9^4 = 6561$ Nelly: $10^4 = 10000$ $10000 - 6561 = 3439$	3439	M1 Number of combinations for Katie or Nelly correct A1 cao
Q17a			M1 An enlargement of scale factor -2 A1 Correct position
Q17b		$x = 4$	B1 cao
Q18a	$a \times 3^2 + b \times 3 = 9a + 3b$	$9a + 3b$	A1 cao
Q18b	3, 5, 7, 9, 11 The n th term is $2n + 1$ 1, 4, 9, 16, 25 The n th term is n^2	$\frac{2n + 1}{n^2}$	M1 $2n + 1$ or n^2 seen M1 Numerator or denominator correct A1 cao

Question	Working	Answer	Notes
Q19	2 litres in the ratio 11 : 29 $2000 \div 40 = 50$ $50 \times 11 = 550\text{ml}$, $50 \times 29 = 1450\text{ml}$ In jug A: 600ml in ratio 1 : 3 $600 \div 4 = 150$ $1 \times 150 = 150\text{ml}$, $3 \times 150 = 450\text{ml}$ Jug B: $550 - 150 = 400\text{ml}$ syrup $1450 - 450 = 1000\text{ml}$ sparkling water Ratio is $400 : 1000 = 2 : 5$	2 : 5	M1 550ml syrup and 1450ml sparkling water in final mixture M1 150ml syrup and 450ml sparkling water in jug A M1 400ml syrup and 1000ml sparkling water in jug B A1 2:5 oe
Q20		$\frac{20x + y}{21}$	B1 cao
Q21a	$4x^2 - 8x - 7 = 0$ $x = \frac{8 \pm \sqrt{(-8)^2 - (4 \times 4 \times -7)}}{2 \times 4}$ $= \frac{8 \pm \sqrt{176}}{8}$ $= 2.66 \text{ or } -0.66$	$x = 2.66$ or $x = -0.66$	M1 Rearranging equation so that one side is 0 M1 Correctly substituting values into quadratic formula A1 Two correct solutions
Q21b	$2^{2x-3} = 2^5$ $2x - 3 = 5$ $x = 4$	$x = 4$	M1 Simplifying LHS to 2^{2x-3} M1 Using the fact that $32 = 2^5$ A1 cao

Question	Working	Answer	Notes															
Q22a	<table><thead><tr><th>Speed, (s mph)</th><th>Frequency</th><th>Frequency Density</th></tr></thead><tbody><tr><td>$0 < s \leq 30$</td><td>12</td><td>0.4</td></tr><tr><td>$30 < s \leq 35$</td><td>22</td><td>4.4</td></tr><tr><td>$35 < s \leq 45$</td><td>34</td><td>3.4</td></tr><tr><td>$45 < s \leq 60$</td><td>3</td><td>0.2</td></tr></tbody></table> 	Speed, (s mph)	Frequency	Frequency Density	$0 < s \leq 30$	12	0.4	$30 < s \leq 35$	22	4.4	$35 < s \leq 45$	34	3.4	$45 < s \leq 60$	3	0.2		M1 Frequency densities correctly calculated M1 <i>ft</i> their frequency densities used to plot histogram A1 Fully correct histogram
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Q22b	Most cars are under 40mph. Not many are under 30mph or up to 60mph.	40mph	B1 cao															
Q23	$2n^2 + 8n + n^2 - 8n + 16 = 3n^2 + 16$ n^2 is always greater than or equal to 0 so $3n^2$ is always greater than or equal to 0. Adding 16 means it is always positive.		M1 Brackets expanded correctly to give $2n^2 + 8n + n^2 - 8n + 16$ M1 Simplified to $3n^2 + 16$ A1 Correct statement following correct working															
Q24a	$V = \frac{1}{3} \times \pi \times 5^2 \times 12 = 314.159...$	$314.2cm^3$	M1 Attempt to substitute values into formula for volume of a cone A1 cao															

Question	Working	Answer	Notes
Q24b	<p>Area scale factor 4 so length scale factor $\sqrt{4} = 2$</p> <p>Volume scale factor $2^3 = 8$</p> <p>Volume is $8 \times 314.159... = 2513.274...$</p>	2513 or 2514cm^3	<p>M1 Length scale factor 2 seen or implied</p> <p>M1 Volume scale factor 2^3 or 8 seen or implied</p> <p>A1 correctly rounded from their working (use of 314.2 gives 2514cm^3 or 314.1592654.. gives 2513cm^3)</p>
Q25	 <p> $\frac{x}{\sin(85)} = \frac{18}{\sin(60)}$ $x = \frac{18}{\sin(60)} \times \sin(85) = 20.7\text{km}$ </p>	20.7km	<p>M1 A roughly correct sketch with the given bearings reasonably correctly drawn</p> <p>M1 Angle $ABC = 85^\circ$</p> <p>M1 Angle $BCA = 60^\circ$</p> <p>M1 <i>ft</i> Use of sine rule with their values correctly substituted</p> <p>A1 cao</p>

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