



THIRD SPACE
LEARNING

Mathematics

Paper 3

(Calculator)

Higher Tier

Mark Scheme

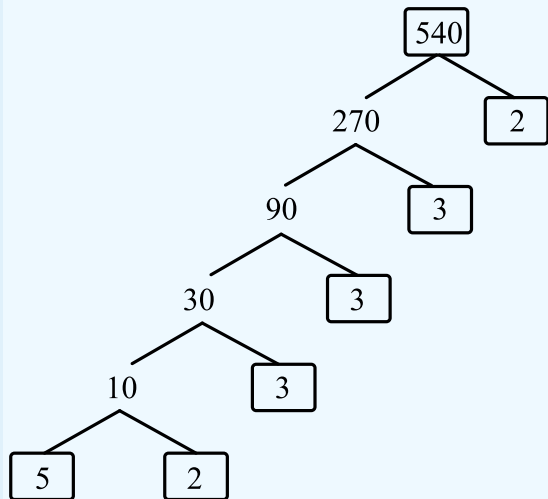
AQA GCSE

SET 2

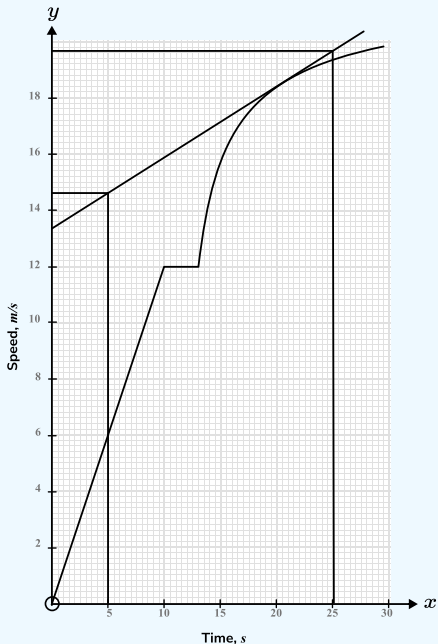
Question	Working	Answer	Notes
Q1		0.32	A1 cao
Q2		$8.65 \leq n < 8.75$	B1 cao
Q3		150%	A1 cao
Q4		480000	A1 cao
Q5a		p^7	A1 cao
Q5b		$4q^5$	M1 $4q^x$ or xq^5 A1 cao
Q6a	$0 \times 8 + 1 \times 13 + 2 \times 7 + 3 \times 3 + 4 \times 1 = 40$ $40 \div 32 = 1.25$	1.25	M1 Multiplying number of siblings by frequencies M1 <i>ft</i> Their sum divided by 32 A1 cao
Q6b	-It is between 0 and 4 -The most common number of siblings was 1 so you would expect it to be around 1		A1 A correct explanation
Q7	Angle sum is $(n - 2) \times 180 = 4 \times 180 = 720^\circ$ 6 angles so interior angle is $720 \div 6 = 120^\circ$ Isosceles triangle so angles ABF and AFB equal $180 - 120 = 60$ $60 \div 2 = 30^\circ$	30°	M1 A correct method to find interior or exterior angle of hexagon M1 Interior angle of hexagon 120° Exterior angle of hexagon 60° M1 $\frac{180 - 120}{2}$ oe with either ‘angles in a triangle add up to 180° ’ or ‘isosceles triangle’ A1 Correct answer following correct reasoning

Question	Working	Answer	Notes
Q8a	Surface area: $2 \times 9 \times 16 = 288$ $2 \times 9 \times x = 18x$ $2 \times 16 \times x = 32x$ $18x + 32x + 288 = 50x + 288$		M1 Attempt to find area of each face M1 Adds all 6 areas M1 Reaches $50x + 288$ following correct method A1 Sets $50x + 288 < 900$
Q8b	$50x < 612$ $x < 12.24$	$x < 12.24$	M1 Subtracting 288 A1 cao
Q8c		12	B1 cao
Q9	$2y = 1.2 \times 10^4$ $4 \times 10^5 + 1.2 \times 10^4$ $400000 + 12000 = 412000$	4.12×10^5	M1 Evidence of correct substitution into $x + 2y$ A1 cao
Q10	$0.5^3 = 0.125 = \frac{1}{8}$ Reciprocal of $0.5 = 2$ $\frac{1}{8} : 2 = 1 : 16$	1 : 16	M1 $0.5^3 = 0.125$ or $\frac{1}{8}$ M1 Reciprocal of $0.5 = 2$ A1 Correct ratio in form 1 : n
Q11	Area of garden: $24 \times 10.5 = 252$ $252 \div 20 = 12.6\text{kg}$ of seed needed 12.6 in ratio 2 : 5 is 3.6 : 9 3.6kg of wildflower seed: $4 \times \text{£}21 = \text{£}84$ 9kg of grass seed: $2 \times 32 = \text{£}64$ $\text{£}84 + \text{£}64 = \text{£}148$	£148	M1 $252 \div 20 = 12.6\text{kg}$ of seed needed M1 12.6 divided in ratio 2 : 5 to give 3.6 : 9 M1 2 bags of grass seed and 4 bags of wildflower seed A1 cao

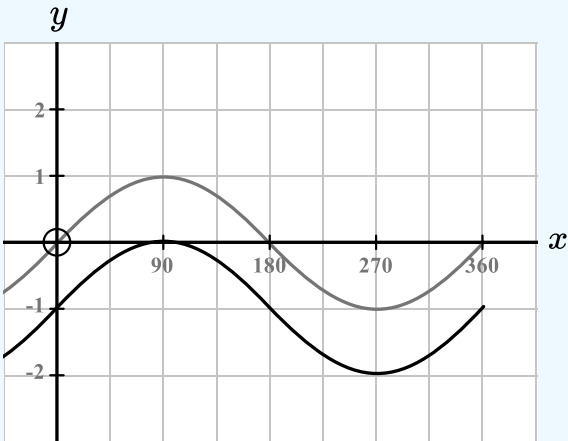
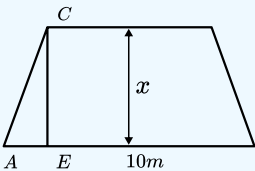
Question	Working	Answer	Notes
Q12a	<p>Saturday</p> <p>Sunday</p> <pre> graph LR A[0.32] --- B[late] A --- C[0.68] C --- D[not late] B --- E[0.4] B --- F[0.6] D --- G[0.4] D --- H[0.6] E --- I[late] F --- J[not late] G --- K[late] H --- L[not late] </pre>		A1 cao
Q12b	$0.32 \times 0.4 = 0.128$ $0.32 \times 0.6 = 0.192$ $0.68 \times 0.4 = 0.272$ $0.68 \times 0.6 = 0.408$ $0.192 + 0.272 + 0.408 = 0.872$	0.872	<p>M1 <i>ft</i> from part a – at least one pair of probabilities for Saturday and Sunday multiplied</p> <p>M1 Either $0.32 \times 0.4 = 0.128$ or $0.32 \times 0.6 = 0.192$</p> <p>$0.68 \times 0.4 = 0.272$</p> <p>$0.68 \times 0.6 = 0.408$ seen</p> <p>A1 $1 - 0.128 = 0.872$ or $0.192 + 0.272 + 0.408 = 0.872$</p>
Q13	$(6x^2 + 3x - 10x - 5)(x + 2)$ Or $(2x + 1)(3x^2 - 5x + 6x - 10)$ $6x^3 + 5x^2 - 19x - 10$	$b = 5$ $c = -19$	<p>M1 $(6x^2 + 3x - 10x - 5)$ or $(3x^2 - 5x + 6x - 10)$</p> <p>A1 $b = 5$</p> <p>A1 $c = -19$</p>

Question	Working	Answer	Notes
Q14a		$2^2 \times 3^3 \times 5$	M1 Attempt at a prime factor tree or equivalent method, with at least two prime factors correctly reached A1 cao
Q14b		15	A1 cao
Q15	Pressure = $\frac{80}{16} = 5\text{N/cm}^2$ 20% of 5 = 1 5 - 1 = 4N $4 = \frac{80}{A}$ $A = 20\text{cm}^2$ $20 - 16 = 4, \frac{4}{16} \times 100 = 25\%$	25%	M1 Original pressure = 5N/cm^2 M1 $4 = \frac{80}{A}$ oe seen M1 New area = 20cm^2 A1 $\frac{4}{16} \times 100 = 25\%$
Q16a		$\frac{73}{150}$	A1 cao
Q16b		$\frac{85}{150}$	A1 oe

Question	Working	Answer	Notes
Q16c	The denominator should be the number who study German – not the full number of students. It should be $\frac{11}{61}$.		B1 A correct explanation
Q17a	$M_2 = 0.8 \times 4500 = 3600$	3600g	A1 cao
Q17b	$0.8 \times 3600 = 2880$ $0.8 \times 2880 = 2304$ 2304 is close to 2250 so he is correct Or $0.8^3 = 0.512$ which is close to 0.5	Yes	M1 2304 or 0.512 seen B1 Correct statement following correct working
Q18a	The train is going at a constant speed		B1 Correct statement
Q18b	$\frac{1}{2} \times 10 \times 12 = 60$ $3 \times 12 = 36$ $60 + 36 = 96m$	96m	M1 Attempt to find area under graph A1 cao

Question	Working	Answer	Notes
Q18c		0.26m/s^2	<p>M1 Appropriate tangent line drawn with a valid attempt to find gradient</p> <p>A1 $0.24 - 0.28\text{m/s}^2$</p>
Q19		$x = 0.45454545\dots$ $100x = 45.454545\dots$ $99x = 45$ $x = \frac{45}{99} = \frac{5}{11}$	<p>M1 $x = 0.45454545\dots$</p> <p>$100x = 45.454545\dots$ seen or implied</p> <p>M1 $99x = 45$</p> <p>A1 $x = \frac{45}{99} = \frac{5}{11}$</p>
Q20	<p>Angle ABC = 42° (Angles in the same segment are equal)</p> <p>ABC is an isosceles triangle (could be indicated on diagram)</p> <p>Angle ACB = $(180 - 42) \div 2 = 69^\circ$</p> <p>Angle CBF is alternate to angle ACB</p>	69°	<p>M1 Angle ABC = 42°</p> <p>M1 Angle ACB = 69°</p> <p>A1 cao</p>

Question	Working	Answer	Notes
Q21a	Radius of circle: $\frac{20\pi}{2\pi} = 10$ Equation of circle: $x^2 + y^2 = 10^2$	$x^2 + y^2 = 100$	M1 Dividing by 2π to find radius M1 Equation of form $x^2 + y^2 = a^2$ A1 cao
Q21b	Distance of (7, 8) from centre of circle, (0, 0): $\sqrt{7^2 + 8^2} = 10.63\dots$ Radius of circle is 10 It is not inside the circle	Outside the circle	M1 $\sqrt{7^2 + 8^2} = 10.63\dots$ M1 Comparison of 10.63... to the radius of the circle, 10 A1 Correct conclusion
Q22a		$-\mathbf{b} + \mathbf{a}$	A1 cao
Q22b	$\overrightarrow{AE} = \mathbf{a} + \frac{2}{3}\mathbf{b}$ $\overrightarrow{EF} = \frac{1}{2}\mathbf{a} + \frac{1}{3}\mathbf{b}$ AE is a multiple of EF and they share the point E therefore AEF is a straight line		M1 $\overrightarrow{AE} = \mathbf{a} + \frac{2}{3}\mathbf{b}$ M1 $\overrightarrow{EF} = \frac{1}{2}\mathbf{a} + \frac{1}{3}\mathbf{b}$ B1 One is a multiple of the other B1 They share the point B and form a straight line

Question	Working	Answer	Notes
Q23a			A1 Translation 1 unit down drawn
Q23b		$y = -\cos(x)$ $y = \cos(x) + 2$	A1 One correct equation A1 Two correct equations
Q24	$AC = \sqrt{(1.1x)^2 + 2^2}$ $= \sqrt{1.21x^2 + 4}$  $AE = \sqrt{1.21x^2 + 4 - x^2}$ $= \sqrt{0.21x^2 + 4}$ $CF = 10 - 2\sqrt{0.21x^2 + 4}$		M1 Length of AC or BC = $\sqrt{1.21x^2 + 4}$ M1 AC is common side of triangle and trapezium so recognised as length of diagonal of trapezium M1 'AE' = $\sqrt{1.21x^2 + 4 - x^2}$ A1 Subtract 2AE from CF to give $10 - 2\sqrt{0.21x^2 + 4}$ Working must be correct throughout to achieve final mark

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