



THIRD SPACE
LEARNING

Mathematics

Paper 4

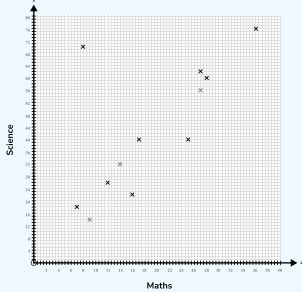
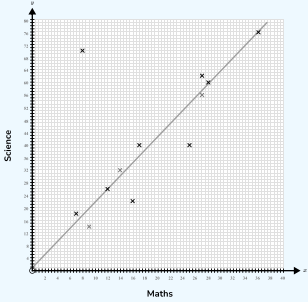
(Calculator)

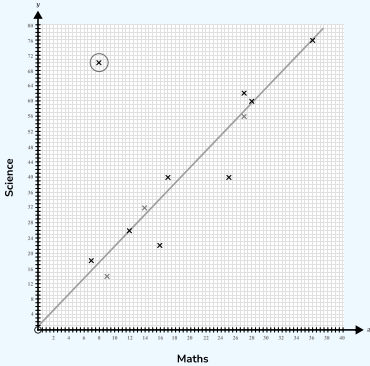
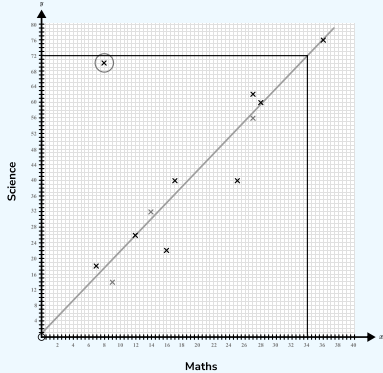
Higher Tier

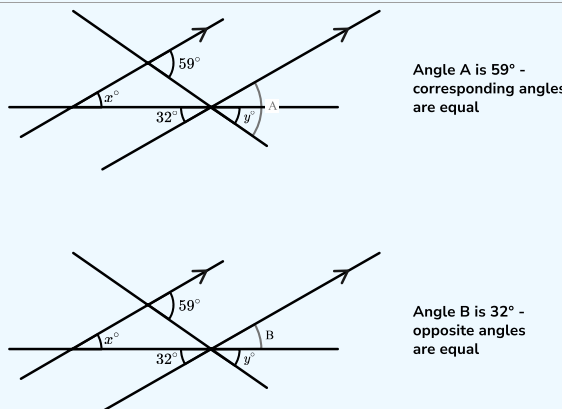
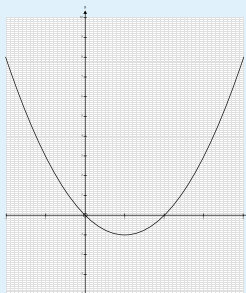
Mark Scheme

OCR GCSE

SET 1A

Question	Working	Answer	Notes
Q1a		4.72×10^6	A1 cao
Q1b		0.0071	A1 cao
Q2	$\frac{11}{3.2}$	3.4375	M1 for 11 or 3.2 A1 oe
Q3	$15y - 12 < 4y + 10$ $11y < 22$ $y < 2$	$y < 2$	M1 Correctly multiplying out brackets M1 Moving all terms in y to one side A1 cao
Q4a			M1 One point plotted correctly A1 All three points correct
Q4bi			A1 Appropriate line of best fit

Question	Working	Answer	Notes
Q4bii			A1 Correct point selected
Q4ci		Positive correlation	B1 cao
Q4cii		The higher the maths score, the higher the science score	B1 Correct relationship
Q4d		72	M1 Evidence that they have used their graph for the estimate e.g. line drawn at 34 for maths A1 Accept 70, 71, 72, 73 or 74
Q5a		£10 per hour	M1 Amount of pay at two different times seen A1 cao
Q5b		£15	B1 cao
Q5c	270 minutes = 4.5 hours $4.5 \times 10 + 15 = £60$	£60	M1 270 minutes = 4.5 hours A1 cao

Question	Working	Answer	Notes																
Q5d	$10d+20=11d+15$ $d=5$	5 hours	M1 Bonus payment £20 and hourly rate £11 both seen M1 $10d+20=11d+15$ or another valid method A1 cao																
Q6ai		32°	A1 cao																
Q6aai		Alternate angle are equal	C1 correct reason																
Q6b	<div><p>Angle A is 59° - corresponding angles are equal</p><p>Angle B is 32° - opposite angles are equal</p><p>Angle $y = 59 - 32 = 27^\circ$</p></div>	<p>Angle A = 59° because corresponding angles are equal</p> <p>Angle B = 32° because opposite angles are equal.</p> <p>Angle $y = 59^\circ - 32^\circ = 27^\circ$</p>	M1 $59^\circ - 32^\circ$ A1 is 27°																
Q7a	<table><tr><td>x</td><td>-2</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>y</td><td>8</td><td>3</td><td>0</td><td>-1</td><td>0</td><td>3</td><td>8</td></tr></table>	x	-2	-1	0	1	2	3	4	y	8	3	0	-1	0	3	8	3, -1, 0	M1 at least 2 values correct A1 cao
x	-2	-1	0	1	2	3	4												
y	8	3	0	-1	0	3	8												
Q7b			M1 Points plotted followed through from their table. Allow one error in plotting A1 Fully correct curve																

Question	Working	Answer	Notes
Q7c		$x=0$ and $x=2$	A1 cao
Q7d		(1, -1)	B1 cao
Q8a	10% of 1200=120 20% of 1200=240 £1200-240=£960	£960	M1 20% of 1200 = 240 or 1200×0.8 seen A1 cao
Q8b	£560=80% £70=10% £700=100%	£700	M1 £560=80% seen A1 cao
Q8c	100%-20%=80% 25% of 80%=20% 80%-20%=60% Total decrease is 40%	No she is not correct because 25% of the sale price is less than 25% of the original price. The total reduction is 40%.	B1 No B1 A suitable explanation stating at least '25% of the sale price is less than 25% of the original price' or 'total reduction 40%'
Q9a	180 - 138 = 42 42 × 2 = 84	84°	M1 Angle ABC=42° A1 cao
Q9bi		tangent	B1 cao
Q9bii	Angle OFN 90° since a radius meets a tangent at 90 Angle FON 180-90-x=90-x since angles in a triangle sum to 180 Angle FOE 180-(90-x)=90+x since angles on a straight line sum to 180 Angle FEO $\frac{1}{2}(180 - (90 + x)) = 45 - \frac{1}{2}x$ since it is isosceles		M1 Correct working to get to $45 - \frac{1}{2}x$ B1 At least two valid steps with reasons seen B1 Each step justified

Question	Working	Answer	Notes
Q10a	E.g. $4 + 12 \times 2 = 4 + 24 = 28$ $4 + 12 = 16$ and double this is 32		M1 Substituting any number into $n + 12 \times 2$ A1 Showing that adding 12 to the number and doubling does not give the same answer
Q10b		$2n + 24$	A1 cao
Q11a	$5 \times 4 \times 10 \times 5 = 1000$	1000	M1 Multiplying 4 numbers M1 At least 3 of those numbers correct A1 cao
Q11b		$\frac{1}{5}$	A1 cao
Q12a		Quantitative Continuous Primary	B1 1 correct B1 1 correct B1 1 correct B1 one correct method B1 two correct methods
Q12b		Ask more people Ask a wider variety of people	B1 one correct method B1 two correct methods
Q13	Interior angle of pentagon: $(3 \times 180) \div 5 = 108$ Other two angles in isosceles triangle: $(180 - 108) \div 2 = 36$ Interior angle of hexagon: $(4 \times 180) \div 6 = 120$ Angle a: $120 - 36 = 84^\circ$	84°	M1 Interior angle of pentagon = 108° M1 Interior angle of hexagon = 120° M1 Using the isosceles triangle to get 36° A1 cao

Question	Working	Answer	Notes
Q14	<p>60% of employees male, 40% female</p> <p>40% of 60% = 24%</p> <p>15% of 40%=6%</p> <p>24%+6%=30%</p> <p>30%= $\frac{3}{10}$</p> <p>Or</p> <p>$\frac{3}{5}$ of employees male, $\frac{2}{5}$ female</p> <p>$\frac{4}{10} \times \frac{3}{5} = \frac{12}{50}$</p> <p>$\frac{3}{20} \times \frac{2}{5} = \frac{6}{100} = \frac{3}{50}$</p> <p>$\frac{12}{50} + \frac{3}{50} = \frac{15}{50} = \frac{3}{10}$</p>	$\frac{3}{10}$	<p>M1 Writing proportion of male and female employees as fractions or decimals</p> <p>M1 Calculation leading to male employees under 30 = 24% oe</p> <p>M1 Calculation leading to female employees under 30 = 6% oe</p> <p>A1 Correct answer given as a fraction</p>
Q15	<p>Volume of sphere:</p> <p>$\frac{4}{3} \times \pi \times 12^3 = 7238.229\text{cm}^3$</p> <p>$7238.229 \div 2 = 3619.1145$</p> <p>Volume of pyramid: $\frac{1}{3} \times 20 \times 20 \times h = 3619.1145$</p> <p>$h = \frac{3619.1145 \times 3}{20 \times 20} = 27.1\text{cm}$</p>	27.1cm	<p>M1 12 substituted into formula for volume of a sphere</p> <p>M1 Correct volume for sphere</p> <p>M1 Volume for sphere divided by 2 and set equal to $\frac{1}{3} \times 20 \times 20 \times h$</p> <p>M1 Attempting to solve to find h</p> <p>A1 cao</p>
Q16a		$345 \leq \text{mass} < 355$	<p>A1 345</p> <p>A1 355</p>
Q16b	<p>Upper bound of area: 7143.5</p> <p>Lower bound of length: 91.45</p> <p>$\frac{7143.5}{91.45} = 78.114\text{m}$</p>	78.114m	<p>M1 Using correct upper bound for area</p> <p>M1 Using correct lower bound for length</p> <p>A1 cao</p>

Question	Working	Answer	Notes
Q17	$P(Y+R): \frac{6}{14} \times \frac{8}{13} = \frac{48}{182}$ $P(R+Y): \frac{8}{14} \times \frac{6}{13} = \frac{48}{182}$ Total probability: $\frac{48}{182} + \frac{48}{182} = \frac{96}{182}$	$\frac{96}{182}$	M1 $\frac{6}{14}$ and $\frac{8}{14}$ and at least one of $\frac{6}{13}$ or $\frac{8}{13}$ seen M1 $\frac{6}{14} \times \frac{8}{13} = \frac{48}{182}$ or $\frac{8}{14} \times \frac{6}{13} = \frac{48}{182}$ M1 adding their probability A1 oe
Q18	4 years: $6000 \times 1.12^4 = 9441.12$ 2 years: $6000 \times 1.12^2 = 7526.4$ $9441.12 - 7526.4 = 1914.72$	1915	M1 Substituting 2 and 4 into 6000×1.12^t M1 Correct values for 2 years and 4 years A1 cao
Q19a	$\frac{2}{x+3} + \frac{4}{2x-1} = \frac{4x-2}{(x+3)(2x-1)} + \frac{4x+12}{(x+3)(2x-1)}$ $= \frac{8x+10}{(x+3)(2x-1)}$	$\frac{8x+10}{(x+3)(2x-1)}$	M1 Correct common denominator $(x+3)(2x-1)$ oe M1 Multiplying numerators appropriately A1 cao
Q19b	$\frac{x^2+8x+15}{2x^2+3x-9} = \frac{(x+3)(x+5)}{(x+3)(2x-3)} = \frac{x+5}{2x-3}$	$\frac{x+5}{2x-3}$	M1 Numerator correctly factorised M1 Denominator correctly factorised A1 cao
Q20	$(2n+1)(2m+1) = 4nm + 2n + 2m + 1$ $= 2(2nm + n + m) + 1$	$2(2nm + n + m) + 1$ The first part is always even since it has a factor of 2. Adding one gives an odd number	M1 Selecting two expressions for odd numbers, e.g. $2n+1$ and $2m+1$ M1 Multiplying the expressions and factorising to show a multiple of 2 plus 1 A1 A correct explanation of why the result is odd
Q21a	$\sqrt{(2-0)^2 + (2-0)^2} = \sqrt{4+4} = \sqrt{8}$	$\sqrt{8}$	M1 Correct values used with Pythagoras' theorem A1 Correct exact answer, accept equivalent surd $2\sqrt{2}$
Q21b	Radius = $\sqrt{8}$	$x^2 + y^2 = 8$	M1 Equation of the form $x^2 + y^2 = a$ A1 cao

Question	Working	Answer	Notes
Q21c	$C = 2 \times \pi \times \sqrt{8}$ $C = 17.77153\dots$	17.8cm	M1 Use of $C = 2\pi r$ or equivalent A1 cao
Q22	$A = kB^2$ $A = k(1.2B)^2$ $A = 1.44B^2$ Percentage increase: $\frac{1.44B^2 - B^2}{B^2} \times 100$ $= 44\%$	44%	M1 Use of $1.2B$ to give $1.44B^2$ M1 Valid attempt to find percentage change A1 cao

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