



THIRD SPACE
LEARNING

Mathematics

Paper 1

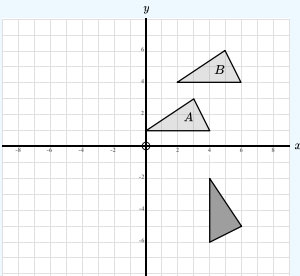
(Non-Calculator)

Higher Tier

Mark Scheme

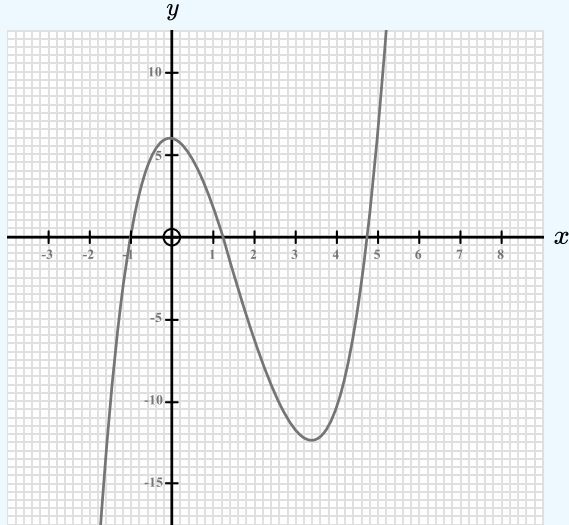
Edexcel GCSE

SET 1B

Question	Working	Answer	Notes
Q1a		a^8	B1 cao
Q1b		$81c^8$	M1 kc^8 where k is a positive integer A1 $81c^8$
Q2a			C1 Ben has written 3 and 3 as a factor pair for 6. It should be 2 and 3
Q2b		$2^3 \times 3^2$	A1 cao must be in index form
Q2c	$90 = 2 \times 3^2 \times 5$ HCF: $2 \times 3^2 = 18$	18	M1 Correctly writing 90 as a product of prime factors M1 Common prime factors correctly identified with attempt to multiply them A1 18 OR M1 correctly listing all factors of 72 or 90 M1 correctly listing all factors of 72 and 90 A1 18
Q3a		No	B1 No C1 The shape has been translated by $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ or other correct statemen
Q3b			M1 Any rotation of 90° A1 Completely correct rotation

Question	Working	Answer	Notes
Q4a	$1\frac{1}{2} + \frac{1}{3} = \frac{3}{2} + \frac{1}{3} = \frac{9}{6} + \frac{2}{6} = \frac{11}{6} = 1\frac{5}{6}$	$\frac{11}{6}$	M1 $\frac{9}{6} + \frac{2}{6}$ or correct equivalent with common denominator A1 Correctly adding to give $\frac{11}{6}$ oe
Q4b	$2\frac{1}{2} \times 1\frac{5}{6} = \frac{5}{2} \times \frac{11}{6} = \frac{55}{12} = 4\frac{7}{12}$	$4\frac{7}{12}$	M1 $2\frac{1}{2}$ their answer to a seen M1 Correctly converting to improper fractions and attempting to multiply numerators and denominators A1 $4\frac{7}{12}$ must be written as a mixed number
Q5a	$\frac{12}{80} \times 7200$ $7200 \div 80 = 90$ $90 \times 12 = 1080$	1080	M1 $\frac{12}{80}$ seen M1 Attempt to find $\frac{12}{80}$ of 7200 A1 1080
Q5b			C1 The sample was random. In reality, the proportion of customers who booked holidays of 10+ nights may be higher or lower or other correct comment

Question	Working	Answer	Notes
Q6	<p>100% in the ratio 1:4 gives 20% of teachers male and 80% of teachers female.</p> <p>30% of 20% = 6%</p> <p>10% of 80% = 8%</p> <p>14% of all teachers are maths teachers.</p> <p>86% are other teachers.</p> <p>14:86 = 7:43</p>		<p>P1 Determining that 20% of the teachers are male and 80% are female</p> <p>P1 Finding 30% of 20% and 10% of 80%</p> <p>P1 Finding total percentage of teachers that are maths teachers</p> <p>P1 Determining the percentage of teachers that are other teachers</p> <p>P1 Writing ratio as 14:86 and simplifying</p>
Q7a	$0.1 \times 0.04 = 0.004\text{m}^2$	0.004m^2	<p>M1 0.1×0.04 seen</p> <p>M1 0.004</p> <p>A1 0.004m^2</p>
Q7b	$8000 = \frac{\text{Force}}{0.004}$ $\text{Force} = 8000 \times 0.004 = 32\text{N}$	32N	<p>M1 Correctly substituting values into $\text{Pressure} = \frac{\text{Force}}{\text{Area}}$. May use rearranged form</p> <p>M1 Reaches $\text{Force} = 8000 \times 0.004$</p> <p>A1 32N</p>
Q8		3^{n-1}	<p>M1 3^x where x is an expression involving n</p> <p>A1 3^{n-1}</p>
Q9a	$180 - 90 - 76 = 14$	14°	<p>M1 Uses the fact that the triangle is a right angle triangle</p> <p>A1 14°</p>
Q9b		76°	B1 cao

Question	Working	Answer	Notes
Q10	$x^2 + 5x - 24 = 0$ $(x + 8)(x - 3) = 0$	$x = -8$ or $x = 3$	M1 Rearranging to $x^2 + 5x - 24 = 0$ M1 Correctly factorising A1 Both answers given
Q11	$0.8 \times 0.5 = 0.4$ $0.4 \times 40 = 16$	16	M1 Multiplying probabilities to give 0.4 M1 Their probability multiplied by 40 A1 16
Q12a		0, 2, -6	M1 At least one value correct A1 All three values correct
Q12b			M1 At least 4 points correctly plotted A1 All points correct and joined with a smooth curve

Question	Working	Answer	Notes
Q13	$p = \frac{k}{q}$ $10 = \frac{k}{30}, k = 300$ $p = \frac{300}{4} = 75$	75	M1 $10 = \frac{k}{30}$ or $k = 300$ M1 $p = \frac{300}{4}$ A1 $p = 75$
Q14	4 multiples of 3 $\frac{4}{10} \times \frac{3}{9} = \frac{12}{90}$	$\frac{12}{90}$	M1 Multiplying two probabilities, at least one of which is $\frac{4}{10}$ oe M1 $\frac{4}{10} \times \frac{3}{9}$ A1 $\frac{12}{90}$ oe
Q15	$\frac{40}{360} \times 2 \times \pi \times 18 = 4\pi$	4π	M1 Attempting $\frac{40}{360}$ multiplied by circumference of circle A1 4π
Q16	$2^{\frac{3}{2}} = \sqrt{2}^3 = 2\sqrt{2}$ $8 = \sqrt{4 \times 2} = 2\sqrt{2}$ $2\sqrt{2} + 2\sqrt{2} + \sqrt{2} = 5\sqrt{2}$	$5\sqrt{2}$	M1 $2^{\frac{3}{2}} = 2\sqrt{2}$ M1 $8 = 2\sqrt{2}$ A1 $5\sqrt{2}$
Q17a	Each square on the vertical axis is 0.1 $1.8 \times 10 = 18$	18	M1 Each square 0.1 seen or implied A1 18

Question	Working	Answer	Notes
Q17b	Over 80: $1.6 \times 10 = 16$ 60 - 65: $3.2 \times 5 = 16$ 65 - 70: $1.4 \times 5 = 7$ 70 - 90: $1.6 \times 20 = 32$ $7 + 18 + 16 + 7 + 32 = 80$ $\frac{16}{20} = \frac{2}{10} = 20\%$	20%	M1 At least 2 of: 60 - 65: $3.2 \times 5 = 16$ 65 - 70: $1.4 \times 5 = 7$ 70 - 90: $1.6 \times 20 = 32$ M1 $1.6 \times 10 = 16$ and attempt at fraction or percentage using total of other frequencies A1 20%
Q18a	$\frac{x^2 - 9}{2x^2 - 6x} = \frac{(x+3)(x-3)}{2x(x-3)} = \frac{x+3}{2x}$		M1 numerator correctly factorised M1 denominator correctly factorised C1 $\frac{x^2 - 9}{2x^2 - 6x} = \frac{x+3}{2x}$ clearly concluded
Q18b	$\frac{x^2 - 9}{2x^2 - 6x} + \frac{4x + 2}{3x} = \frac{x+3}{2x} + \frac{4x+2}{3x}$ $= \frac{3x+9}{6x} + \frac{8x+4}{6x} = \frac{11x+13}{6x}$	$\frac{11x+13}{6x}$	M1 Substituting $\frac{x^2 - 9}{2x^2 - 6x}$ for $x+3$ and $\frac{4x+2}{3x}$ M1 Using a common denominator A1 $\frac{11x+13}{6x}$
Q19		(90, 1) (360, 0)	B1 cao B1 cao
Q20	$\frac{x}{\sin(45)} = \frac{8}{\sin(30)}$ $x = \sin 45 \times \frac{8}{\sin 30}$ $x = \frac{\sqrt{2}}{2} \times \frac{8}{\frac{1}{2}}$ $x = \frac{\sqrt{2}}{2} \times 16$ $x = \frac{16\sqrt{2}}{2}$ $x = 8\sqrt{2}$		B1 $\sin(30) = \frac{1}{2}$, $\sin(45) = \frac{\sqrt{2}}{2}$ seen or implied M1 sine rule used to give $\frac{x}{\sin(45)} = \frac{8}{\sin(30)}$ oe M1 $x = \frac{8}{\frac{1}{2}} \times \frac{\sqrt{2}}{2}$ reached C1 correct steps to reach $8\sqrt{2}$

Question	Working	Answer	Notes
Q21a		$4r = 3h$ $4r^2 = 1.5(\pi r^2 + \pi r(h + 1))$	<p>P1 A correct equation derived from the volumes e.g., $\frac{4}{3}\pi r^3 = 3(\frac{1}{3}\pi r^2 h)$, equation may be simplified.</p> <p>P1 A correct equation derived from the surface areas. Equation may be simplified.</p>
Q21b	$\frac{4}{3}\pi r^3 = 3(\frac{1}{3}\pi r^2 h)$ $\frac{4}{3}\pi r^3 = \pi r^2 h$ $4r = 3h$ $4r - 3h = 0$ (A) $4\pi r^2 = 1.5(\pi r^2 + r(h + 1))$ $4\pi r^2 = 1.5\pi r^2 + 1.5rh + 1.5r$ $4r = 1.5r + 1.5h + 1.5$ $2.5r - 1.5h = 1.5$ $5r - 3h = 3$ (B) (B)-(A): $r = 3$ $4(3) - 3h = 0$ $h = 4$	$r = 3, h = 4$	<p>M1 $4r - 3h = 0$ or $5r - 3h = 3$ oe simplified equation</p> <p>M1 Attempt to solve equations simultaneously</p> <p>A1 $r = 3, h = 4$</p>

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