

Question			Answer	Marks	Part marks and guidance	
1	(a)		250	2	B1 for [2 :] 500 If 0 scored SC1 for answer of figs 25	Ignore any units seen
	(b)		4500	2	M1 for $\frac{7200}{1+2+5}$ [×5] soi by 900	
2			12	1		not y^{12}
3	(a)	(i)	$2 \times 2 \times 2 \times 3 \times 5$ oe	3	M2 for 2, 2, 2, 3, 5 which could be on a tree diagram or in a table or for an answer one step away from correct answer e.g. $2 \times 2 \times 2 \times 15$ or M1 for correct complete method with one error or one step from correct method e.g tree or multiple division or B1 for two of 2, 3 and 5 as factors	So $2^3 \times 3 \times 5$ scores 3 marks and $2^3, 3, 5$ scores M2 see additional guidance
		(ii)	9	2	B1 for an answer of 18, 36, 45, 72, 90, 180 or 360.	
	(b)		168	2	M1 for $2^3, 3$ and 7 selected	condone $2^3 \times 3 \times 7$ for 2 marks even if calculated incorrectly
4	(a)		accept any correct explanation e.g. sample size is small, no mention of subjects being randomly selected	1		If more than one choose the best one see list of exemplars
	(b)		two points accurately plotted	2	B1 for each	tolerance $\pm \frac{1}{2}$ small square and use overlay as a guide
	(c)		positive	1		ignore any extras e.g. strong

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	(d)		a line or a mark between (35,9) and (35,15) 9 to 15	1 1		use overlay as a guide, a clear indication of method to find their answer
	(e)		9 soi For putting <i>their</i> 9 out of 12 into a percentage oe e.g. 9 in 12 or $\frac{9}{12}$ [=] 75[%] A correct conclusion from <i>their</i> 9 e.g. "No/she is wrong"	B1 M1 A1FT	Accept any correct reasoning e.g. M1 for 0.80×12 or 9.6 A1FT for a correct conclusion from <i>their</i> 9 e.g. "No/she is wrong" If no points plotted in (b) award M1 for 8 [out of 10] = 80[%] and A1 for "Yes"	9 can be implied by 75 Accept fractions, decimals or percentages providing the two figures can be compared FT <i>their percentage or figure</i>
5	(a)		610.7 to 632.2	5	B2 for 1425 to 1475 or B1 for 11.4 to 11.8 or M1 for <i>their length</i> $\times 125$ AND B1 for $2\frac{1}{3}$, 2[h] 20 or 2.33... or 140 and M1 for distance $\div$ time and A1FT ft for a correct answer for <i>their length</i>	See additional guidance This calculation must be seen and distance must be <i>their</i> measurement or <i>their</i> measurement $\times 125$. You must be convinced that it is a time as a divisor.

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	(b)		accept any correct reason e.g. it may not have flown in a straight line or it may have been diverted	1		If more than one choose the best one. Comment about distance only, see list of exemplars.
6	(a)		Reflection $y = x$ oe	1 1		Double transformation scores 0
	(b)		Rotation [centre] (0,0) [+]90 or 90 anti-clockwise or -270 or 270 clockwise	2 1 1	 If 0 scored then award B2 for correct position of the intermediary triangle	Double transformation scores 0 <u>unless</u> the second one is reflection in $x = 0$ or in the x/y axis. accept origin and O as centre use overlay as a guide
7	(a)		Accurate angle bisector with 2 pairs of correct arcs Arc centre C radius 7cm Correct region indicated	2 2 1Dep	B1 for correct bisector with no arcs or incorrect arcs B1 for arc centre C with incorrect radius Dependent on at least B1 for bisector and B2 for arc	The bisector does not have to go through A but if extended it must go through A and it must lie within green lines in overlay. For 2 marks condone intersecting arcs of equal radius, one centre B and the other centre C for the construction with bisector drawn. For arc, measure radius using ruler. tolerance ± 2 mm and $\pm 2^\circ$ for both constructions

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	(b)		accept any correct assumption e.g. Road[s] is not/are not straight, road AB is busier than road AC, land is not suitable for construction	1		If more than one choose the best one see list of exemplars
8			145.2 to 146.2	5	B1 for angle CBD = 28 soi or for angle BCD = 90 soi and M2 for $\frac{6.4}{\sin 28}$ oe or 13.6[3...] nfw or M1 for $\sin [28] = \frac{6.4}{[.]}$ oe and M1 for $\pi \times (\text{their radius})^2$	B1 implied by e.g. 28 or 62 correctly used in trigonometry or 28, 62 or 90 (or symbol) marked in the correct place in the diagram 13.6... can imply B1 however if it is marked on the wrong side, e.g. on AC, then it scores 0 marks

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9			15	6	B5 for $[x=]$ 4.5 or $4\frac{1}{2}$ and $[y=]$ -0.5 or $-\frac{1}{2}$ even given as answers OR B2 for $5x - y - 8 = 3x + 5y + 4$ or $3x + y - 4 = 2x - 6y - 3$ and M1dep for rearranging either equation correctly so that the x's, y's and numbers are combined in <u>one</u> of the equations and M1dep for multiplying one equation to equate coefficients of one variable and M1dep for the correct method to eliminate a variable If 0 scored SC1 for equating two adjacent sides e.g. $5x - y - 8 = 2x - 6y - 3$	accept 15 or 9 either way round for 6 marks The next M1s are dep on B2 gained. For M1 need an equation with one x term, one y term and one number term and allow one numerical error e.g. $2x - 6y = 12$ oe or $x + 7y - 1 = 0$ oe . allow one numerical error e.g. $2x - 6y = 12$ and $2x + 14y = 2$ allow one numerical error e.g. $20y = -10$
			9			

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10			24	5	accept any correct method e.g. M1 for $1 - [0].6$ soi by $[0].4$ or 40 M1 for $[0].6 \times [0].2$ or $[0].12$ or 12 soi by $[0].096(9.6)$ M1 for $[0].216 - [0].12$ or $[0].096(9.6)$ M1 for <i>their</i> $[0].096 \div [0].4$ or $[0].24$	Working may be in decimals (or %) e.g. table based on 100 : $\begin{array}{rcc} & L & L^1 \\ M & 12 & 48 & 60 \\ M^1 & 9.6 & 30.4 & 40 \\ & 21.6 & 78.4 & 100 \end{array}$
11			32.25	4	accept any correct method e.g. B1 for 1.15 M1 for $y = k(1.15 \times x)^2$ M1 for $(1.15^2 - 1) [\times 100]$ or $[0].3225$ OR B2 for 1.15^2 or 1.3225 or B1 for 1.15 M1 for $(1.15^2 - 1) [\times 100]$ or $[0].3225$ If 0 scored award B1 for $y = kx^2$	accept if k replace by a numerical value
12	(a)		16 500	1		
	(b)		18	1		
	(c)		7460 and 8250 oe or [0].452... and [0] .5 oe	2	M1 for $[16\ 500 \times] .82^4$ or 7460 or [0].452	accept 7460.01 or 7460.009... accept any correct argument for 2 marks e.g. 7460×2 and 16 500 or better

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13	(a)		420	2	M1 for $6 \times 10 \times 7$	
	(b)		$6 \times 10 + 6 \times 7 + 10 \times 7$ or $60 + 42 + 70$ [=172]	3	M2 for two correct products shown or M1 for one correct product shown	
14	(a)		27	1		
	(b)		$\frac{27}{45}$ or $\frac{3}{5}$ or [0].6 or $\frac{\text{their}(a)}{45}$ oe	2	B1 for $\frac{27}{n}$ or $\frac{\text{their}(a)}{n}$ or $\frac{k}{45}$ (n, k are positive integers and fractions are proper)	Any fraction or percentage equivalent to $\frac{27}{45}$ for 2 marks, the fractions must be proper and isw if conversion or cancelling after an acceptable answer
15	(a)		$(x - 4)^2 + 9$	3	B1 for $(x - 4)^2$ B2 FT for 9	FT $\text{their } (x - 4)^2$
	(b)		(4 , 9)	2	B1FT for each part	FT $\text{their } (x - 4)^2 + 9$
	(c)		Translation $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$	2	B1 for translation B1FT for $\begin{pmatrix} 4 \\ 9 \end{pmatrix}$	award B1 if it FT from either (a) or (b) and condone e.g. 4 right 9 up
16			$(3x - 4)(x + 5)$ and $\frac{4}{3}$ oe and -5	3	B2 for $(3x - 4)(x + 5)$ or B1 for two factors giving two correct terms and B1FT for two answers correct from <i>their</i> factors If 0 scored then B1 for two correct answers	For $\frac{4}{3}$ accept 1. $\frac{4}{3}$, 1.33[3...] and $1\frac{1}{3}$

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17	(a)		$y = \frac{1}{x}$	1		
	(b)		$y = \sin x$	1		
	(c)		$y = 2^x$	1		
18			11.1 or 11.14 or 11.13[6...] or accept 11 with supporting working.	6	M3 for correct cos rule with cos as subject e.g. $[\cos =] \frac{6.4^2 + 5.8^2 - 3.9^2}{2 \times 6.4 \times 5.8}$ or M2 for the above (M3) formula with one error or for $3.9^2 = 6.4^2 + 5.8^2 - 2 \times 6.4 \times 5.8 \times \cos[.]$ or M1 for this (M2) formula with one error AND M2 for $\frac{1}{2} \times 6.4 \times 5.8 \times \sin(\text{their } 36.87\dots)$ or M1 for the use of this formula with one error	accept any correct method and they can find any angle, see additional guidance for the other angles this angle (opposite 3.9) is 36.87... which implies M3
19			[a =] 2 [b =] 3 [c =] -5	4	B2 for [a =] 2 or M1 for second differences = 4 and M1 for revised differences of -2 1 4 7 or B1 for <i>b</i> or <i>c</i> correct	

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20			-0.3 5.3	6	B1 for $(x + 2)(x - 3)$ oe seen M1 for $5(x - 3) + 3(x + 2)$ oe or better M1FT for $2x^2 - 10x - 3 [= 0]$ or FT <i>their</i> correct attempt to form a quadratic equation with at most two errors M1FT for $\frac{-(-10) \pm \sqrt{(-10)^2 - 4 \times 2 \times -3}}{2 \times 2}$ oe condoning at most two errors or better FT <i>their</i> 'quadratic equation' A1 for each of -0.3 or 5.3 or for both answers correct but to more than 1dp. or A1FT for two answers correct to 1 d.p. FT from <i>their</i> 'quadratic equation'	likely seen in $2(x + 2)(x - 3)$ implied by $x^2 - x - 6$ implied by $5x - 15 + 3x + 6$ or $8x - 9$ $2x^2 - 10x - 3 [= 0]$ seen scores 3 marks, condone e.g. $2x^2 - 10x = 3$ for 3 marks for completing the square see additional guidance For A1 the correct answers are - 0.28388... and 5.28388... and can be rounded or truncated. Note: for A1FT they must get M1 first.