

Question			Answer	Mark	Part Marks	Guidance
1	(a)		B	1		Accept any clear indication e.g. the cone or the second one May be on diagram
	(b)		G	1		Accept any clear indication e.g the third one May be on diagram
	(c)		Kite or isosceles trapezium with only the given line of symmetry and no right angles	2	<p>B1 for correct shape but inaccurate or</p> <ul style="list-style-type: none"> • kite with right angle • arrowhead without right angle • rhombus <p>B0 for</p> <ul style="list-style-type: none"> • square • rectangle • non-isosceles trapezium • arrowhead with right angle • parallelogram • triangle or shape with 5 or more sides 	<p>Mark intention: accept vertices $\pm 2\text{mm}$ and freehand for 2 marks If in doubt, use overlay as guide. Place so the correct point would be in the centre of the square and <i>their</i> point must be in, or on, square formed by red lines within overlay Condone slight extensions, gaps and wobbles</p> <p>If more than 1 drawing and no clear choice mark the worst</p> <p>Mark boldest lines as intended diagram</p>
2	(a)	(i)	>	1		
	(a)	(ii)	=	1		
	(b)		3	1		
3	(a)		... 5×5 or 5^2	1		As last line on working lines
	(b)		125	1		
	(c)		29	1		

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4	(a)	20	2	M1 for $125 \div 6.25$ oe	May be 20 repeated subtraction or addition in a list Accept 6.25×20 for M1
	(b)	1080	3	B2 for figs 108 OR M2 for $12\,000 \times (77 - 68)$ oe or M1 for $12\,000 \times 77$ or $12\,000 \times 68$ or $77 - 68$	May be in working or on answer line May be implied by figs 924 – figs 816 oe may be e.g. $12\,000 \times (0.77 - 0.68)$ or $12\,000 \times 0.09$ Subtraction should be seen but may be implied by layout Condone subtraction written the wrong way around May be implied by figs 924... or figs 816 ... or 9
5	(a)	(-3, 3) plotted correctly	1		Use overlay if in doubt Take centre of mark as position If A used as plot, scores 1 if centre of A in correct position
	(b)	5	1		
	(c)	Ruled vertical line $x = 2$	1		Accept good freehand and dashed line If more than one vertical line and no clear choice mark the worst, ignore line at $x = -3$ If $y = 2$ also drawn and not rejected, treat as choice Use overlay to check if in doubt At least 2 cm long. If line more than 2 cm then must be in overlay throughout length.
	(d)	(-3, -2)	2	B1 for answer (2, -2) or (-3, -2) seen or plotted on grid If 0 scored, SC1 for answer (-3, ...) or (... , -2)	Ignore other points

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6	(a)	(i)	$12a$ final answer	1		Accept $12 \times a$ or $a12$ or $a \times 12$
		(ii)	b^4 final answer	1		Do not accept $b4$ but BOD if 4 appears raised above the base of b
		(iii)	c^6 final answer	1		Do not accept $c6$ but BOD if 6 appears raised above the base of c
	(b)		$3(3 - 2y)$ final answer	1		May be $3 \times (3 - 2y)$ or $-3(-3 + 2y)$
7			39	3	<p>M2 for $0.7 \times (60 + 60) - 45$ oe or M1 for $0.7 \times (60 + 60)$ oe implied by 84</p> <p>OR</p> <p>M2 for $70 \times 2 - \frac{45}{60} \times 100$ implied by 65 or M1 for $\frac{45}{60} \times 100$ implied by 75</p> <p>OR</p> <p>M2 for $\frac{45 + []}{2} = 0.7 \times 60$ oe or M1 for 0.7×60 oe implied by 42</p> <p>If 0 scored, SC 2 for answer $\frac{39}{60}$</p>	<p>Accept 39 out of 60 for 3 marks</p> <p>e.g. $84 - 45$</p> <p>e.g. $140 - 75$</p> <p>e.g. $45 + [] = 84$</p> <p>An implied M mark stands so long as there is no evidence to suggest that it is not used to reach the answer</p>

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8	(a)	30	2	M1 for $\frac{4 \times (9 + 6)}{2}$ oe or $4 \times 6 + \frac{4 \times 3}{2}$ oe or $4 \times 9 - \frac{4 \times 3}{2}$	Implied by $24 + 6$ Implied or by $36 - 6$
	(b)	50	2	B1 for $d = 100$ seen or M1 for $2\pi r = 100\pi$ or for $\pi d = 100\pi$ or $\frac{100}{2}$	Accept e.g. $[r =] \frac{100\pi}{2\pi}$

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9	(a)		2	B1 for one correct region	Condone number 1 and/or number 2 repeated
	(b)	$\frac{1}{13}$ or 0.076 to 0.077	1	FT <i>their</i> diagram for numerator	Accept 7.6% to 7.7% isw after correct, or FT, fraction seen
	(c)	10 has been counted twice oe	1		See appendix
		$\frac{7}{13}$ or 0.53[8..] to 0.54	1		Accept 53[8..]% to 54%

Question		Answer	Mark	Part Marks	Guidance
10	(a)	3 : 7	2	B1 for 9 : 21 or 6 : 14 or seen or for answer 1 : 2.3[3...] or 0.42 to 0.43 : 1	Ignore incorrect cancelling once a correct, partially simplified ratio seen
	(b)	4	2	M1 for $\frac{1}{5} \times 5$ or $1 \div \frac{1}{5}$ or $\frac{4}{5}$ oe seen or B1 for equivalent ratio to 1 : 4 oe seen	0.8 or 80% e.g. 2 : 8, $\frac{1}{4} : 1$, 0.25 : 1
	(c)	5 nfww	3	M2 for $(3 \times 25) \div 15$ or M1 for (3×25) implied by 75 or $\frac{25}{15}$ implied by 1.6 to 1.7 OR M2 for $3 \times 5 \div 3$	NB The following are wrong methods and score M0 $25 \div 3 = 8.33...$ and then $15 \div 8.33... = 1.8$ rounded to 2 So $3 + 2 = 5$ Also $15 \div 3 = 5$ and also $25 \div 5 = 5$ From using the inverse of 25 days $\div 5 \times 3$ to get 15 days
11		Yes Yes No Yes	2	B1 for 3 correct	Accept any unambiguous indication e.g ✓ for yes or ✗ for no

Question		Answer	Mark	Part Marks	Guidance
12	(a)	108	3	<p>M2 for $\frac{72}{360} \times 540$ oe or</p> <p>M1 for $\frac{72}{360}$ oe or $\frac{540}{360}$ oe</p>	<p>May be e.g. $72 \div \frac{360}{540}$ or $72 \div 0.66$ to 0.67 or $540 \div 5$</p> <p>Implied by e.g. $\frac{1}{5}$ or 5 or 0.2 or 20% or e.g. 1.5 or 0.66 to 0.67 accept Inverse $\frac{360}{72}$ or $\frac{360}{540}$ accept $360 \times x = 72 \times 540$ for M1 where x is any variable or 216 [students] NOT from $360 - 72 - 72$</p>
	(b)	162	3	<p>M2 for $\frac{3}{4} \times (360 - 2 \times 72)$ oe</p> <p>OR</p> <p>M1 for $\frac{3}{4} \times []$ oe or B1 for 216</p>	<p>or $\frac{3}{4} \times (540 - 2 \times \text{their } 108) \times \frac{360}{540}$ oe e.g. $540 - 216 (= 324)$ $\rightarrow 324 \div 4 (= 81)$ $\rightarrow 324 - 81 (= 243)$ $\rightarrow 243 \times \frac{360}{540}$ or $243 \div \frac{540}{360}$ or $243 \div 1.5$</p> <p>NB $\frac{360}{540} = \frac{2}{3}$ and the inverse is often 1.5 [] < 540</p>
13	(a)	$\sqrt{16} = 4$ or $4^2 = 16$	M1		Ignore other correct roots e.g. $\sqrt{9} = 3$ unless these used to reach answer.
		2	A1	If 0 scored, SC1 for answer 2 with no or confused or insufficient working	Must just be 2
	(b)	It would not change oe	1		The square root symbol only gives the positive root, so no change oe

Question		Answer	Mark	Part Marks	Guidance
14	(a)	No and $\frac{73}{70}$ or 1.04[...] or 104% AND is greater than 1 oe or is not equal to 1 oe or He won't have enough money oe	2	Not "It's improper fraction" or "Top heavy" M1 for $\frac{1}{2} + \frac{2}{5} + \frac{1}{7}$ soi $\frac{73}{70}$ or $0.5 + 0.4 + 0.14[...]$ soi 1.04[...] or $50[\%] + 40[\%] + 14[...%]$ soi 104[...%]	Accept equivalent fractions, decimals or percentages Allow using an amount of money. Check <i>their</i> total or difference for 2 marks If comparing fractions, must have common denominator or numerator. Accept e.g. $\frac{10.4[...]}{10}$ for $\frac{73}{70}$ May be M1 for $1 - \left(\frac{1}{2} + \frac{2}{5}\right)$ soi $\frac{1}{10}$ and for 2 marks No $\frac{1}{7} > \frac{1}{10}$ or $\frac{10}{70} > \frac{7}{70}$ or M1 for $1 - (0.5 + 0.4)$ soi 0.1 and for 2 marks No $\frac{1}{7} = 0.14[...]$ > 0.1 or M1 for $1 - \left(\frac{1}{2} + \frac{1}{7}\right)$ soi $\frac{5}{14}$ and for 2 marks No $\frac{5}{14} = \frac{25}{70}$ $\frac{2}{5} = \frac{28}{70} > \frac{25}{70}$ oe
	(b)	256	2	M1 for $320 \times \frac{2}{5}$ [x 2] oe soi 128	e.g. $\frac{4}{5} \times 320$ or $640 \times \frac{2}{5}$ or 640×0.4 or 320×2 [= 640] and [<i>their</i> 640] $\div 5 =$ [<i>their</i> 128]

Question		Answer	Mark	Part Marks	Guidance
15		The [age] groups overlap oe	1		See appendix Mark the best part of a single statement provided no contradiction or incorrect statements If more than one criticism, mark the worst Allow describing one or more common values or giving correct scales
16	(a)	4.9×10^{-1} , 9.5×10^1 , 2.4×10^2 , 1.3×10^3 ,	1		Mark the answer line and look for order of indices -1, 1, 2, 3 Condone TE if unambiguous If answer given as ordinary numbers must be correct 0.49, 95, 240, 1300
	(b)	4.5×10^3	2	B1 for 4500 or for 500 and 4000	For B1 accept poor form e.g. 45×10^2
17	(a)	29 500	1		
	(b)	Accept any correctly matched pair of values in which rugby < football from these ranges rugby: 30 450 to 30 498 and football: 30 451 to 30 499	2	B1 for one value for rugby or football in these ranges rugby from 30 450 to 30 498 or football from 30 451 to 30 499	Error interval alone scores 0 Only mark candidate's chosen value(s) Rugby < football does not need to be stated If a pair of values and rugby or football not stated assume the value on the left or below another is rugby For B1 if one or multiple values seen and no clear choice/designation all must be in range 30 451 to 30 498
18		$k = \frac{t+h}{2}$ oe final answer	2	B1 for answer $\frac{t+h}{2}$ oe or M1 for $t+h=2k$ or $\frac{t}{2} = k - \frac{h}{2}$	For 2 oe allow $k = \frac{t}{2} + \frac{h}{2}$ or $k = 0.5t + 0.5h$ For B1 oe allow $\frac{t}{2} + \frac{h}{2}$ or $0.5t + 0.5h$ $t - 2k + h = 0$ does not count as the first correct step

Question		Answer	Mark	Part Marks	Guidance
19	(a)	83 or 84	3	<p>M2 for $150 \times \frac{5}{9}$ oe implied by answer 83.3...</p> <p>or</p> <p>M1 for $\frac{5}{9}$</p> <p>or for $\frac{150}{9}$</p>	<p>Non calculator methods must be fully correct, see appendix, and would lead to 83.3</p> <p>May be implied by 0.55 to 0.56 or 55% to 56%</p> <p>May be implied by 16.6 to 16.7</p>
	(b)	$\frac{3}{5}$	2	B1 for $\frac{12}{20}$ oe	For B1 accept 0.6 or 60% or $\frac{12}{20} \times 150$
	(c)	[Ling has] more results [than Riley] oe	1		<p>See appendix</p> <p>Accept he/they/she as reference to Ling</p> <p>May be inverse: [Riley has] fewer results [than Ling] oe</p> <p>Do not accept comments about more/less in the bag</p>

Question		Answer	Mark	Part Marks	Guidance
20		$17\,000 \times 0.85 \times 0.9$ oe	M3	M2 for $17\,000 \times \frac{100 - 15}{100}$ oe soi 14 450 or M1 for $17\,000 \times \frac{15}{100}$ oe soi 2550	Allow subtractions the wrong way round if intention clear For non-calculator methods, see appendix N/C methods allow layout to imply addition Labels (correct values) (incorrect values) e.g. M1 10% = 1700 M0 10% = 1750 ✘ 5% = 850 5% = 875 15% = 2550 15% = 2625 M1 10% = 1700 5 % = 850 15% = 1550 ✘ Condone slip in addition Accept any value except 17 000 for <i>their</i> 14 450 After M0 accept 17 000 for <i>their</i> 14 450
		[final value =] 13 005		B1	

Question		Answer	Mark	Part Marks	Guidance
21		37 with correct working	5	<p>M1 for $2x + 5 + 3x - 1 + x = 100$ may be implied by a subsequent correct equation</p> <p>M1 for simplifying <i>their</i> equation to $ax + b = c$ or $6x + 4 = 100$</p> <p>M1 for the first correct step in solving <i>their</i> $ax + b = c$</p> <p>and</p> <p>M1 for substituting <i>their</i> 16 into $2x + 5$</p> <p>OR</p> <p>M3 for one complete correct evaluation of $2x + 5 + 3x - 1 + x = 100$ or M2 for one complete correct evaluation of $2x + 5 + 3x - 1 + x = a$ total or M1 for one correct evaluation of each expression $2x + 5$ [+] $3x - 1$ [+] x</p> <p>If 0, 1 or 2 scored, instead award SC3 for answer 37 with no or insufficient working</p> <p>If 0 or 1 scored, instead award SC2 for $x = 16$ with no or insufficient working</p>	<p>“Correct working” requires evidence of first method and at least M1 and $x = 16$ or M3 if using trials or M2M1 for non-algebraic method Three separate expressions are not enough</p> <p>Ignore inclusion of % in working</p> <p>$6x + 4 = 100$ scores M1M1</p> <p>e.g. $6x = 100 - 4$ $6x = 96$ scores M1M1M1</p> <p>For M marks with trials: allow each term or each expression from the question evaluated separately e.g. (Use 10) $20 + 5 + 30 - 1 + 10 = 64$ or $25 (+) 29 (+) 10 = 64$</p> <p><u>Alternative method (Non algebraic)</u></p> <p>M2 for $100 - 5 + 1$ oe or M1 for $- 5 + 1$ or $- 4$</p> <p>AND</p> <p>M1 for <i>their</i> $(100 - 5 + 1) \div 6$</p> <p>AND</p> <p>M1 for substituting <i>their</i> 16 into $2x + 5$</p>

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22		Accurate ruled perpendicular bisector of AB with two correct pairs of supporting arcs	2	B1 for accurate ruled perpendicular bisector of AB with no or incorrect arcs	Use overlay as a guide Put ruler on screen to check 2 cm if needed Tolerance ± 2 mm and $\pm 2^\circ$. Line length at least 2 cm Bisector crosses between circles of overlay but does not cut them and perpendicular by eye
		Accurate ruled bisector of angle ABC with two correct pairs of supporting arcs	2	B1 for accurate ruled bisector of angle ABC with no or incorrect arcs	Tolerance $\pm 2^\circ$. Line length at least 2 cm Bisector between or on red lines of overlay arcs.
		Correct position of boat clearly identified at point of intersection of two straight lines	1 dep	Dep on at least B1 and B1	
23	(a)	[They should have] divided by 1.25 or multiplied by 0.8 oe or 2625 increased by 25% is 3281.25/not 3500	1		See appendix Mark the best part of the statement unless there is contradiction or an incorrect statement
	(b)	3304	4	M3 for $3500 \div 1.25 \times 1.18$ oe or M2 for $[k \times] 1.18 \div 1.25$ soi by 0.944 or for $3500 \div 1.25$ soi 2800 or for $m \times 1.18$ where m is <i>their</i> value for 2020 or M1 for 1.25 or 1.18 seen	For non-calculator methods see appendix May be $1.25 \div 1.18$ soi 1.059... m can be 2625 (which gives 3097.5) May be implied by 1.475 NC 1.25 may be e.g. $k \div 4 + k$, $k =$ a number

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24	(a)	<p>Correct substitution of (x, y) from integer point on curve into equation leading to $k = 3$</p> <p>e.g. $(2, 4)$</p> <p>$4 = 2k - 2^2 + 2$ or $4 = 2k - 4 + 2$ leading to $k = 3$ with at least one correct intermediate step</p>	2	<p>M1 for correct substitution of (x, y) from integer point on curve into $y = kx - x^2 + 2$ or $y = 3x - x^2 + 2$</p> <p>OR</p> <p>M1 for e.g. $x = 2$ correctly substituted in $y = 3x - x^2 + 2$ and finding $y = 4$</p> <p>Max M1 if $k = 3$ substituted</p>	<p>$(-1, -2) : -2 = -[1]k - (-1)^2 + 2$ $(1, 4) : 4 = [1]k - 1^2 + 2$ $(2, 4) : 4 = 2k - 2^2 + 2$ $(3, 2) : 2 = 3k - 3^2 + 2$ $(4, -2) : -2 = 4k - 4^2 + 2$</p> <p>Use of $(0, 2)$ scores 0 but may be replaced with another point (ie do not treat as a choice)</p> <p><u>Examples of intermediate steps</u></p> <p>$4 = 2k - 2^2 + 2$ then $4 = 2k - 4 + 2$ is a sufficient int step or $4 = 2k - 2$ is a sufficient int step or $6 = 2k$ is a sufficient int step $3 = k$</p>
	(b)	0.4 and 2.6	2	<p>B1 for 0.4 or 2.6</p> <p>or</p> <p>M1 for line $y = 3$ drawn or for $(0.4, 3)$ and $(2.6, 3)$ indicated</p>	<p>Line to cut curve twice Treat $x = 3$ drawn or multiple horizontal lines as choice unless $y = 3$ clearly chosen Condone good freehand line eg circled or lines drawn down to x-axis</p>

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25	2.1[0...] nfw	4	<p>M1 for $\frac{360}{60}$ oe soi by 6</p> <p>AND</p> <p>Method 1 using tan:</p> <p>M2 for $[h =] 20 \tan(\text{their } 6)$ oe</p> <p>or</p> <p>M1 for correct use of $\tan(\text{their } 6)$ oe</p> <p>or</p> <p>Method 2 using sine rule:</p> <p>M2 for $[h =] \frac{20 \sin(\text{their } 6)}{\sin(90 - \text{their } 6)}$</p> <p>or</p> <p>M1 for $\frac{\sin(\text{their } 6)}{h} = \frac{\sin(90 - \text{their } 6)}{20}$ oe</p> <p>or</p> <p>Method 3 using cos and Pythagoras:</p> <p>M2 for $\sqrt{\left(\frac{20}{\cos(\text{their } 6)}\right)^2 - 20^2}$</p> <p>or</p> <p>M1 for $\left(\frac{20}{\cos(\text{their } 6)}\right)^2 - 20^2$</p>	<p>May be on diagram</p> <p>In all methods, if their angle is not 6 then method must be seen, not implied by interim answers unless stated otherwise Accept any acute angle used for <i>their</i> 6</p> <p>eg $[h =] \frac{20}{\tan(90 - \text{their } 6)}$</p> <p>eg $\tan(\text{their } 6) = \frac{h}{20}$</p> <p>NBs $\frac{\text{approx. circumference}}{60} = \frac{40\pi}{60} = 2.1$ scores 0 $20 \sin 6 = 2.1$ scores M1 for 6 Solution from scale drawing scores a maximum of M1 if 6 seen</p>
Total	100			