

Mark scheme

Question			Answer/Indicative content	Marks	Guidance
1	a		70	1	
	b		Line drawn to 65mm for May	1	Mark intention Condone freehand Allow slight inaccuracy Do not allow horizontal line drawn from 65
	c		170	2	FT 35 [+] <i>their</i> 70 [+] 65 correctly evaluated B1 for 35 [+] 70 [+] 65 or B1FT: 35 [+] <i>their</i> 70 [+] 65 FT for 2 marks <i>Their</i> 70 from 3(a) Values could be given on diagram in 3b
			Total	4	
2	a		41	2	B1 for only 3 and 44 identified
	b		9 nfw	3	M2 for $17.5 \times 6 - (10 + 3 + 28 + 44 + 11)$ oe or M1 for 17.5×6 may be implied by 105 or $10 + 3 + 28 + 44 + 11$ may be implied by 96
			Total	5	
3	a		20	1	

	b		10	2	M1 for $40 - 30$	Must see subtraction sign if answer incorrect
	c			3	B2 for 35 OR M2 for $200 - (40 + 75 + 20 + 30)$ or M1 for 40, 75, 20, 30	7 blocks in any orientation FT <i>their</i> values
			Total	6		
4	a		60 19 21 8 10	3	FT <i>their</i> $19 - 11$ for <i>their</i> 8 B2 for 3 correct or B1 for 2 correct	
	b		Rafting and [R=] 41 or $8 + 12 + 10 + 11$ [S=] 23 or $3 + 5 + 5 + \text{their } 10$ [T=] 36 or <i>their</i> $8 + 4 + 20 + 4$	3	FT <i>their</i> (a) even if NR M2 for two from [R=] 41 or $8 + 12 + 10 + 11$ [S=] 23 or $3 + 5 + 5 + \text{their } 10$ [T=] 36 or <i>their</i> $8 + 4 + 20 + 4$ or M1 for one from [R=] 41 or $8 + 12 + 10 + 11$ [S=] 23 or $3 + 5$	Accept <i>their</i> most popular with strict FT from <i>their</i> three correct totals for these sports Sums must be correctly evaluated May be on diagram Accept labelled or in correct order Check 13 + <i>their</i> 10 Check 28 + <i>their</i> 8 If (a) is NR , FT all marks.

					+ 5 + their 10 [T=] 36 or <i>their</i> 8 + 4 + 20 + 4 If 0 or 1 scored, instead award SC2 for Rafting = 41 which is 18 more than S and 5 more than T	The values will be: [R=] 8 + 12 + 10 + 11 or 41 [S=] 3 + 5 + 5 or 13 [T=] 4 + 20 + 4 or 28 and the answer R[afting] and the sums or totals seen
	c		$\frac{46}{100}$ oe	2	FT <i>their</i> 21 B1 for <i>their</i> 21 + 25 correctly evaluated or 46 seen If (a) is NR, award $\frac{25}{100}$ SC1 for answer oe or answer $\frac{1}{25}$	Ignore attempts to change form Accept fraction, decimal (e.g. 0.57) and percentage (e.g. 57%) but not ratio nor in words For B1, condone $\frac{1}{46}$ as 46 seen
	d		[That] these [100] children are representative of all children [who attend the adventure park] oe	1		See Appendix Representative sample
			Total	9		
5			Correct reason given e.g. Her sample may not be representative oe Her sample is too small oe	1		She should do the test more than 10 times She should do the test e.g. 100/1000 times.

					Mark best response as long as not contradictory or incorrect For additional information refer to 'Qn25, 2024 June, Alternative J560/02, Mark Scheme Appendix' within downloadable resource materials.
			Total	1	
6			2.12	3	M1 for $[0 \times 11], 1 \times 10, 2 \times 9, 3 \times 7, 4 \times 8, 5 \times 5$ M1 for <i>their</i> $\sum(\text{books} \times \text{freq}) \div 50$ May be implied by $[0,] 10, 18, 21, 32, 25$ or 106 For M1 allow one error or omission in calculation or answers Must be a sum of products
			Total	3	
7	a		8	1	
	b		16 or 2	2	M1 for $5 + 11$ or $13 - 11$
			Total	3	
8	a		35	1	<u>Examiner's Comments</u> This question was correctly answered by a very high proportion of candidates. A few responded with 70, presumably from reading the value for April instead.

	b		Line drawn to 55mm for May	1	Mark intention Condone freehand Allow slight inaccuracy, end of line should be on or within overlay Do not allow horizontal line drawn from 55 <u>Examiner's Comments</u> This question was successfully answered by most. Common errors were vertical lines that were too high, only giving a point rather than a vertical line, or adding a horizontal line (usually across to 55). Candidates should also consider that their bar ought to be similar in width to the ones given for March and April in the chart.
	c		160	2	FT <i>their</i> 35 [+] 70 [+] 55 correctly evaluated B1 for 35 [+] 70 [+] 55 or B1FT: <i>their</i> 35 [+] 70 [+] 55 FT for 2 marks "their 35" from 3(a) Values could be given on diagram in 3b <u>Examiner's Comments</u> Most candidates gave the correct answer of 160. A follow through (FT) mark was given for candidates who had an incorrect value for Question 3 (a). Candidates who showed working by

					giving the three values they were using generally picked up at least 1 mark, however a small number of candidates showed no values and were given 0 marks.
			Total	4	
9	a		41	2	B1 for only 2 and 43 identified Examiner's Comments Many candidates gave the correct answer, though with little evidence of method. Those who did not give the correct answer often chose the wrong values and 14 was a common error. A small number confused range with mean or median.
	b		47 nfw	3	M2 for $23.5 \times 6 - (14 + 2 + 26 + 43 + 9)$ oe or M1 for 23.5×6 may be implied by 141 or $14 + 2 + 26 + 43 + 9$ may be implied by 94 23.5 x 2 and 4.7 x 10 are examples of wrong working Examiner's Comments There were many correct attempts at this question, although a sizeable number of candidates did not get beyond 1 mark for finding the total of the original five numbers (or often the mean of the five numbers), not realising the key to solving the problem was that the mean of all six numbers must equal 6 x 23.5.
			Total	5	
10	a		40	1	

					<u>Examiner's Comments</u> Most candidates gave the correct answer.
	b		10	2	M1 for $30 - 20$ Must see subtraction sign if answer incorrect <u>Examiner's Comments</u> Most candidates gave the correct answer. A small number just gave the number that travelled by car.
	c			3	B2 for 35 OR M2 for $200 - (40 + 75 + 20 + 30)$ or M1 for 40, 75, 20, 30 3 blocks in any orientation FT <i>their</i> values <u>Examiner's Comments</u> Many were able to show the correct number 35 on the pictogram. Those who did not gain full marks often scored M1 for a correct interpretation of the diagram by placing 40, 75, 20 and 30 in the correct rows.
			Total	6	
11	a		Repeating pattern	1	Accept any correct pattern that repeats annually Accept reference to seasons for Qs e.g. Lower in q2

						than q1 or Highest in q3 or Lowest in q4 etc or Sales in q1 or 2 or 4 rise each year Do not accept “Low sales in 2023” etc
	b		2022 and [Q3 is] higher than in the other years oe	1		Accept summer or “it” etc for Q3 Condone [Year] 2 for [Year] 2022 <u>Examples</u> It increased more than other years They had the most amount of sales Sales rose more than other years It is higher The sales are higher/est [in 2022] The graph shows more sales of products (BOD)
	c		The trend/pattern will continue oe	1		Do not accept references to the weather Do not accept “Sales stay the same” Accept e.g. Sales will increase The pattern stays the same
			Total	3		
12	a		45[mm]	1		
	b		9 : 14 final answer	2	B1 for 45 : 70 or B1FT for <i>their (a)</i>	Where <i>their</i> 70 is

					: 70 or 45 : <i>their</i> 70	between 65 and 75 inclusive
	c		40	3	M2 for <i>their</i> 65 + <i>their</i> (a) – <i>their</i> 70 or M1 for <i>their</i> 65 + <i>their</i> (a) If 0 scored, instead award SC1 for 65, 45 and 70	M1 implied by 110 SC could be seen on the graph or in parts (a) and/or (b)
			Total	6		
13			50	3	M2 for $(40 \times 3) - (23 + 47)$ oe or M1 for 40×3 or for $\frac{23+47+c}{3} = 40$ or better	M1 implied by 120 Accept any letter or symbol for missing age
			Total	3		
14	a		22 23 55 8 7	3	FT <i>their</i> 22 – 14 for <i>their</i> 8 B2 for 3 correct or B1 for 2 correct Examiner's Comments Many candidates gained 3 marks for a correctly completed tree. A few made numerical slips when calculating some of the entries. A small number of candidates placed values in the wrong place, such as placing '55' where the value should have been '22'. Some interchanged '22' and '23' in their respective positions. A tiny minority did not attempt the question.	

			Tennis and [R=] 37 or $11 + 12 + 5 + 9$ [S=] 20 or $3 + 5 + 5 + \text{their } 7$ [T=] 43 or $\text{their } 8 + 6 + 25 + 4$	3	FT <i>their</i> (a) even if NR M2 for two from [R=] 37 or $11 + 12 + 5 + 9$ [S=] 20 or $3 + 5 + 5 + \text{their } 7$ [T=] 43 or $\text{their } 8 + 6 + 25 + 4$ or M1 for one from [R=] 37 or $11 + 12 + 5 + 9$ [S=] 20 or $3 + 5 + 5 + \text{their } 7$ [T=] 43 or $\text{their } 8 + 6 + 25 + 4$ If 0 or 1 scored, instead award SC2 for Tennis = 43 which is 6 more than R and 23 more than S Accept <i>their</i> most popular with strict FT from <i>their</i> three correct totals for these sports. Sums must be correctly evaluated. May be on diagram. Accept labelled or in correct order. Check $13 + \text{their } 7$. Check $35 + \text{their } 8$. If (a) is NR, FT all marks. The values will be: [R=] $11 + 12 + 5 + 9$ or 37 [S=] $3 + 5 + 5$ or 13 [T=] $6 + 25 + 4$ or 35 and the answer R[afting] and the sums or totals seen Examiner's Comments Many correct answers were seen. 'Show how you decide' indicated that working or values were needed to score and most candidates followed this request. Some however placed their totals not in the answer space, but anywhere around the tree or even beside the initial table. Examiners followed through from the candidate's tree and so many scored full marks here despite making errors in part (a). A few candidates only showed the highest total, not considering that to show which was the most popular
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					activity it would be necessary to show all three totals.						
	c		$\frac{57}{100}$ oe	2	FT <i>their</i> 22 or 11 + 3 + <i>their</i> 8 B1 for <i>their</i> 22 + 35 correctly evaluated or 57 seen If (a) is NR, award $\frac{35}{100}$ SC1 for answer oe or answer $\frac{1}{35}$ Ignore attempts to change form Accept fraction, decimal (e.g. 0.57) and percentage (e.g. 57%) but not ratio nor in words For B1, condone $\frac{1}{57}$ as 57 seen Examiner's Comments Many correct answers were seen. Follow through could be awarded where candidates had an incorrect tree. Some candidates just responded with '57', which scored 1 mark. Candidates generally gave their answer as a fraction, but quite a few decimals were seen and a couple of percentages. A few candidates gave their answer as a ratio or in words (e.g. 'Fairly likely') and these scored 0 marks.						
	d		[That] these [100] children are representative of all children [who attend the adventure park] oe	1	Representative sample <table><tr><th>Assumption</th><th>Mark</th><th>Reason</th></tr><tr><td>All children choose in the same way as these children</td><td>1</td><td>Has the idea of a representative sample</td></tr></table>	Assumption	Mark	Reason	All children choose in the same way as these children	1	Has the idea of a representative sample
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					<table border="1"><tr><td>Every group of 100 will chose the same options every time</td><td>1</td><td>BOD does not say "in the same proportion" but implies representative sample</td></tr><tr><td>45% of children that weren't in the 100 would choose football</td><td>1</td><td>Indicates representative sample</td></tr><tr><td>That every child that turns up for the adventure park will choose the same options as the 100</td><td>1</td><td>BOD. Does not say "in the same way as the 100" but indicates representative sample</td></tr><tr><td>The same proportions apply to all other children coming to the park</td><td>1</td><td>Representative sample</td></tr><tr><td>Because 45 is 45% of every 100 children that come to the park</td><td>1</td><td>Representative sample</td></tr><tr><td>45%/0.45 of ALL children will choose football</td><td>0</td><td>Repeats question</td></tr></table>	Every group of 100 will chose the same options every time	1	BOD does not say "in the same proportion" but implies representative sample	45% of children that weren't in the 100 would choose football	1	Indicates representative sample	That every child that turns up for the adventure park will choose the same options as the 100	1	BOD. Does not say "in the same way as the 100" but indicates representative sample	The same proportions apply to all other children coming to the park	1	Representative sample	Because 45 is 45% of every 100 children that come to the park	1	Representative sample	45%/0.45 of ALL children will choose football	0	Repeats question
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					<u>Examiner's Comments</u> Most candidates did not get a mark. Many answers restated the comment in some way or gave suggestions such as that Alex assumed each person was 1%, or that they all turned up, or that football was very popular, or that they didn't want to play golf. Many seemed to not understand what an assumption was. There was very little understanding that Alex had assumed the sample represented the preferences of all people at the adventure park.  Assessment for learning Candidates need to practise giving concise reasons and presenting these for peer consideration.																		

			Total	9	
15			Correct reason given e.g. Her sample may not be representative oe Her sample is too small oe	1	She should do the test more than 10 times She should do the test e.g. 100/1000 times. Mark best response as long as not contradictory or incorrect Response Mark 1 The machine took a random sample so it will not always be <u>6 bolts out of 10</u> to the correct length (<i>implies not representative</i>) 1 2 Janes claim may be unreliable as she <u>only</u> did 1 sample and it might not be 60% all the time (<i>'only' implies too small a sample</i>) 1 3 Because she's only checked 10 out of thousands so she needs to check a higher amount to measure probability 1 4 Because not every 10 bolts will have 6 correct ones 1 5 6/10 of the bolts may not always be 6/10 it could be 4/10 she needs to do the test again 1 6 Only collects 10 bolts (<i>implies small sample</i>) 1 7 It's a random selection 0 8 Because the more samples you have the more unreliable it is 0 9 Because she hasn't sampled all 2000 bolts meaning she cannot claim 1200 are of the correct length 0 10 They may not be reliable because her evidence on these lengths are facts its not 60% 0 11 Because they have to be correct to 1 decimal place 0 12 The machine took a random sample so it will not always be 6 bolts to the correct length (<i>not enough</i>) 0 13 Only an estimate 0 14 Because there could be more or less bolts which are longer or shorter 0 15 Might not be accurate, and she is

					going off the 10 bolts (<i>Not as good as Exemplar 6, 'only' needs a reference here</i>) 0 <u>Examiner's Comments</u> Many candidates attempted to describe that this sample may not be representative, but struggled with communication. Often incorrect statements about picking the bolts 'randomly' was the reason identified, or suggestions of the percentage or the rounding being incorrect. The most successful responses focused on the small nature of the sample, however few such responses were seen.
			Total	1	
16		2.2		3	M1 for $[0 \times 11], 1 \times 8, 2 \times 10, 3 \times 8, 4 \times 7, 5 \times 6$ M1 for <i>their</i> $\Sigma(\text{books} \times \text{freq}) \div 50$ May be implied by $[0,] 8, 20, 24, 28, 30$ or 110 For M1 allow one error or omission in calculation or answers Must be a sum of products <u>Examiner's Comments</u> Some candidates were able to give the correct response. The main error in working out the 'books $\times$ frequency' products was to have '$0 \times 11 = 11$', which then led to a total number of books read as 121 rather than 110.  Misconception Several candidates either divided the total of students (50) by the number of groups (6), or divided the total number of books read (110) by the number of groups.

			Total	3	
17	a		6	1	<u>Examiner's Comments</u> The majority of candidates ordered the numbers by size and choose the middle value, arriving at the correct answer. A small number of candidates attempted to find the mean.
	b		18 or -3	2	M1 for $3 + 15$ or $12 - 15$ <u>Examiner's Comments</u> Many gave the answer 18, with a small number giving -3.
			Total	3	
18	a		Not used the key oe 12	1 1	e.g. Each circle is 4 students/not 1 student Misinterpreted/Not interpreted the key <u>or reverse:</u> $\frac{3}{4}$ of a circle should have been drawn See AG Response Mark <u>Key not being used/Misinterpreted</u> 1 Not looked at the key 1 2 Counted circles as 1's rather than 4's 1 3 Counted the circles but hasn't referred to the key 1 4 They didn't understand what 1 circle represents (<i>Misinterpretation of the key</i>) 1 5 They didn't understand what one circle 1 circle represents. They didn't add them. 1 6 Counted the circles only 1

					7 Not counted the circles correctly. They added the three circles, they were supposed to count $4 + 4 + 4 = 12$ 1 8 Mistaken each circles value 1 9 Misinterpreted the diagram and circle values 1 10 Not looked at the key and how many students each circle represents 1 11 Counted a circle per person instead of 12 people (<i>First part of answer is correct, the second part references the correct answer</i>) 1BOD 12 Counted 1 circle as 1 where it should be 12 (<i>First part of answer is correct, the second part references the correct answer</i>) 1BOD <u>What the diagram should show 1</u> 13 Put three circles instead of three quarters of a circle (<i>diagram would have a three quarters of a circle if Monday was 3</i>) 1 14 Put three full circles instead of $\frac{3}{4}$ 1 15 Done this wrong because a full circle means 4 students so he should have drawn $\frac{3}{4}$ of a circle 1 16 12 students late (<i>Not answering the question</i>) 0 17 Done that wrong because the circle represents 4 students not 3 (<i>contradiction</i>) 0 18 Done full circles 0 19 Said that a whole circle represents 4 students, therefore it is misleading (<i>to be correct the candidate would have had to say 1 student, as this is not stating what Alex has done incorrectly</i>) 0 20 Wrote down that 12 students were late when 3 students were late (<i>referencing the key being incorrect, not what Alex has done incorrectly</i>) 0
	b			1	
			Total	3	
19			192.5	4	M1 for 177.5×5, may be implied by 887.5 M1 for 180×6, may be implied by 1080

					M1 for <i>their</i> 180×6 – <i>their</i> 177.5×5 <u>Alternative method</u> <u>e.g.</u> M2 for $(180 - 177.5) \times 5$ Or M1 for <i>their</i> $(180 - 177.5) \times 5 + 180$	
			Total	4		
20	a		12	1		
	b		4	1		
	c		Bar height 17	1		Condone freehand. Must have sides and a top nearer to 17 than 16 or 18 Width ± 2 mm by eye
			Total	3		
21	a		117	3	M2 for $\frac{78}{360} \times 540$ oe or M1 for $\frac{78}{360}$ oe or $\frac{540}{360}$ oe	May be e.g. $78 \div \frac{360}{540}$ or $78 \div 0.66$ to 0.67 or $540 \div 4.615\dots$ Implied by e.g. $\frac{13}{60}$ or 4.615.. or 0.2166.. or 21.66...% or e.g. 1.5 or 0.66 to 0.67 accept Inverse $\frac{360}{78}$ or $\frac{360}{540}$ accept $360 \times x = 78 \times 540$ for M1 where x is any variable or 234 [students]
	b		153	3	M2 for $\frac{3}{4} \times (360 - 2 \times 78)$ oe	$\frac{3}{4} \times (540 - 2 \times \text{their } 117) \times \frac{360}{540}$ oe

					OR M1 for $\frac{3}{4} \times []$ oe or B1 for 234	e.g. $540 - 234 (= 306)$ $\rightarrow 306 \div 4 (= 76.5)$ $\rightarrow 306 - 76.5 (= 229.5)$ $\rightarrow 229.5 \times \frac{360}{540}$ or $229.5 \div \frac{540}{360}$ or $229.5 \div 1.5$ NB $\frac{360}{540} = \frac{2}{3}$ and the inverse is often 1.5 $[] < 540$
			Total	6		
22	a		45	2	M1 for at least two of 20, 16 and 9 or for attempt to sum <i>their</i> three values	May be seen on bar chart <i>their</i> three values MUST be stated.
	b		$2\frac{1}{4}$ squares drawn Key: 4	1 1		Mark intention to draw quarter of a square in any orientation. Allow for internal line of picture to be omitted.
			Total	4		
23			7 11 13 [23]	3	Conditions: (i) range of 16 (ii) median of 12 (iii) four different prime numbers ≤ 23 B2 for numbers meeting two conditions or B1 for numbers meeting one condition	Ignore the order of the numbers Examples: e.g. 7, 11, B3 (i), 13, [23] (ii), (iii) 7, 11, B2 (i), 17, [23] (iii) 7, 12, B2 (i), (ii) 12, [23] 7, 12, B2 (i), (ii) [23] 7, [23] B1 (i)

					12, 12, [23] B1 (ii) 1, [23] B1 (ii) 11, 13, 17, [23] B1 (iii) 7, 13, 23, [23] B1 (i) Accept negatives, decimals, fractions
			Total	3	
24			20	3	B1 for [median =] 2.5 M1 for <i>their</i> median $\times 10 - 5$ Accept only 20 for 3 marks If 3 (mode) or 2.25 (mean) or other wrong value from 1 to 3 used M1 still available.
			Total	3	
25			[137] 91 93 279 in any order With correct working	5	M3 for $5x$ and 465 or for $(150 \times 4 - 137 + 2) \div 5$ A1 for 93 or M2 for a correct algebraic expression and correct constant or for $150 \times 4 - 137 [+ 2]$ or for $137 + 91 + 93 + 279 = 150 \times 4$ oe or for trials leading “correct working” requires at least M2 150×4 can be implied by 600 throughout e.g. $137 + x - 2 + x + 3x$ and 600; $5x - 2$ and 463 Do not accept x, $3x$ or $x - 2$ as correct algebraic

					to the correct answer or M1 for $137 + x - 2 + x + 3x$ nfw or 150×4 or 600 If 0 or 1 scored, instead award SC2 for 91, 93, 279 in any order with no or insufficient working If 0 scored, SC1 for $[x =] 93$	expressions for M2 Condone e.g. $137 + x - 2 + x + 3x \div 5$ for M1 Mark to candidate's advantage
			Total	5		
26			7	1		
			Total	1		
27			At least one from 1, 1, 2, 3 1, 1, 2, 4 1, 1, 2, 5 or one judge awards 3, 4 or 5 oe and 1, 1, 2 [stay the same]	2	B1 for four values in order with median 1.5 with one not from 1 to 5 or for one judge awards 3, 4 or 5 without mentioning 1, 1, 2 Condone inclusion of 1, 1, 2, 2, with another correct list. Accept 3 to 5 for 3, 4 or 5 and condone 2 included e.g. 2 to 5 Accept "the rest stay the same" oe for 1, 1, 2	
			Total	2		
28			9	2		

					B1 for only 3 and 12 identified	
			Total	2		
29			2 correct from e.g. Bars are unequal width Vertical scale is not linear Vertical axis does not start at 0	2	B1 for each Response Mark Bars are not the same thickness/width 1 It has to be 2 or 3 or 5 lines wide, not different 1 April has 2 boxes/squares, July has 5 and June has 3 (<i>implies width</i>) 1 May is wider 1 Scale should start at 0 not 10 1 Scale is not linear 1 Difference in frequency is not equal/consistent 1 Scale goes up in 10s then in 5s 1 Scale is inconsistent 1 Bars are different lengths without reference to numbers or x-axis 0 Bars are different sizes (<i>no reference to width</i>) 0 May is not the same as others (<i>no reference to width or equivalent</i>) 0 May is taking 5 columns (<i>no reference to others</i>) 0 May has more boxes/ squares (<i>no reference to width</i>) 0 Frequency axis is labelled wrong 0 It's not spread evenly (<i>what isn't ?</i>) 0	Both marks may be scored in one sentence
			Total	2		
30	a		Correct bar at 46	1		Accept clear intention but do not accept a vertical line to 46
	b		No, not true with valid supporting reason	1		e.g. 100% being the same as all students who cycled or e.g. percentage cannot be greater

					than 100% <u>in this context</u> oe If values are used, they must be correct Any incorrect statement invalidates the mark Response Mark 1 No because 100% means everyone 1 2 No that would be all of the students and more (<i>this would also score if they hadn't stated 'and more'</i>) 1 3 No There can only be 100% of the students 1 4 No it is over 100% meaning all of them would have cycled to school 1 5 No 125% means all students cycled to school (<i>we can condone use of 125% as 'all would have cycled'</i>) 1 6 This could not be true as not everyone cycled to school (<i>could not be true is fine to imply 'no'</i>) 1 7 This could not be true as 125% is 1.25 times more students which is impossible (<i>BOD 'more'</i>) BOD 1 8 No it cannot because 125% is more than the total which isn't possible (<i>BOD 'total' implies students</i>) BOD 1 9 No, that is more students than there is in the school (<i>BOD a % rather than 125 as there are 700</i>) BOD 1 10 No because how can more than 100% cycle (<i>the word cycle is referring to the context</i>) BOD 1 11 No because only 25 students cycled (<i>needs reference to all or less than 100%</i>) 0 12 No because 125% of all students would be over 70 and only 25 cycled on Wednesday (<i>should be 700</i>) 0 13 No because it's less than the number of people in the school (<i>interpreted as 125 rather than 125%</i>) 0 14 No, 25/700 isn't 125% (<i>true but doesn't answer the question with reference to 125% > 100%</i>) 0 15 No this could not be true as 100% is all the students. There were 55 students who didn't cycle on Monday (<i>The 1st sentence alone would score, but the</i>
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					<i>additional incorrect statement loses the mark)</i> 0 All of the following score 0 as they do not refer to the context of the question 16 No, it could only be out of 100% 0 17 No because the percent is out of 100 0 18 No because 125% is impossible 0 19 No there should always be 100% 0		
	c		6	3	<table><tr><td>M2 for $\frac{42}{700} \times 100$ oe or M1 for $\frac{42}{700}$oe or $\frac{n}{700} \times 100$ oe</td><td>e.g. $42 \div 7$ $n < 60$</td></tr></table>	M2 for $\frac{42}{700} \times 100$ oe or M1 for $\frac{42}{700}$ oe or $\frac{n}{700} \times 100$ oe	e.g. $42 \div 7$ $n < 60$
M2 for $\frac{42}{700} \times 100$ oe or M1 for $\frac{42}{700}$ oe or $\frac{n}{700} \times 100$ oe	e.g. $42 \div 7$ $n < 60$						
			Total	5			
31	a		Correct, labelled pie chart with correct working	6	<table><tr><td>M2 for $360 - (140 + 80 + 30)$ oe or M1 for $140 + 80 + 30$ AND M1 for $\frac{3}{5} \times \text{their}$ 110 oe A1 for 66 or M1 for $\frac{2}{5} \times \text{their}$ 110 oe A1 for 44 AND</td><td> “correct working” requires at least M1M1 and ruled line If there are labelled angles, mark the method that leads to the angles If angles are not shown mark worst method May be implied by 110 May be implied by 250 Mark to the candidate’s advantage <i>Their</i> 110 < 360 66 implies M1A1 44 implies M1A1 </td></tr></table>	M2 for $360 - (140 + 80 + 30)$ oe or M1 for $140 + 80 + 30$ AND M1 for $\frac{3}{5} \times \text{their}$ 110 oe A1 for 66 or M1 for $\frac{2}{5} \times \text{their}$ 110 oe A1 for 44 AND	“correct working” requires at least M1M1 and ruled line If there are labelled angles, mark the method that leads to the angles If angles are not shown mark worst method May be implied by 110 May be implied by 250 Mark to the candidate’s advantage <i>Their</i> 110 < 360 66 implies M1A1 44 implies M1A1
M2 for $360 - (140 + 80 + 30)$ oe or M1 for $140 + 80 + 30$ AND M1 for $\frac{3}{5} \times \text{their}$ 110 oe A1 for 66 or M1 for $\frac{2}{5} \times \text{their}$ 110 oe A1 for 44 AND	“correct working” requires at least M1M1 and ruled line If there are labelled angles, mark the method that leads to the angles If angles are not shown mark worst method May be implied by 110 May be implied by 250 Mark to the candidate’s advantage <i>Their</i> 110 < 360 66 implies M1A1 44 implies M1A1						

					B1 for ruled line at 66° B1 for <i>their</i> larger sector labelled 'bus' and smaller sector labelled 'car'	Tolerance $\pm 2^\circ$ only if correct working seen.
	b		Walk	1		
			Total	7		
32	a		Correct reason	1	e.g. all could be over 50 0 people over 50 are more likely to be in the park at that time too small a sample vary the time various age groups	Response Mark Over 50s more likely to be in the park at that time 1 There might be no one below 50 1 Because he could ask more people that are under 50 than over 50 1 The first 20 might all be the same age 1BOD People under 50 will be at work and more over 50 may be in the park 1BOD Not diverse enough 0 Not everybody may be out at the time the survey is taken 0 How do we know they all watched television 0 Won't know what age they will be 0
	b		Any three from: Larger sample size Vary the time of day/day Ensure equal numbers [of older and younger adults are asked] Vary the location	3	B1 for each	isw incorrect reasons Response Mark

					Use statistics from other days 1 Make the survey available online <i>implies more people and different age groups 1</i> Go to the park and ask individually every person, confirm ages, equal amounts of both under and over 50 0, 0, 1BOD Make sure you ask their age 0 It should be a closed question 0 The journalist should be unbiased 0 Go to the park and ask 20 adults 0 Go to a TV stop/a place with TVs 0 Have a wider time range <i>as there is no time range/limit 0</i> Do it on a Tuesday <i>as just on a different day of the week would make no difference 0</i> Asking people of all ages <i>not the same as ensuring equal numbers 0</i> Ask females and males <i>not relevant to the data required 0</i>
			Total	4	
33	a		6	2	B1 for only 2 and 8 identified
	b		5	2	M1 for $(6 + 8 + 2 + 3 + 8 + 3) \div 6$
			Total	4	Condone missing brackets for M1
34	a	i	11	1	
		ii	6	1	
	b		Comedy	1	
	c		48	2	M1 for 10 [+] 8 [+] 11 [+] 12 [+] 7 seen
	d		5 : 7	3	B1 for 28 or (<i>their</i> 48 – 20)
					May be on graph seen
					Their students from (c)

					M1 for 20 : <i>their</i> 28 OR M2 for $\frac{5}{12} : \frac{7}{12}$ seen Or M1 for $\frac{20}{48} : \frac{28}{48}$ oe seen If 0 scored, SC1 for answer 7 : 5	<i>Their</i> 28 is any value from 13 to 47 May be on answer line For M1 ratio must be seen and not implied from a ‘simplified’ version 20 : 28 implies B1 M1 28 : 20 implies B1 oe 0.416[...] : 0.583[...]
			Total	8		
35	a		$\frac{180}{360}$ oe fraction	1	Expect $\frac{1}{2}$ but ignore attempts to cancel initially correct fraction but not convert to decimal or percentage Answer 0.5 after $\frac{1}{2}$ seen scores 0	
	b		No oe and [in 2020] they won fewer matches (or half the number of matches) than [in 2019] oe or the win fraction went down to $\frac{1}{4}$ oe [from $\frac{1}{2}$ oe] or the win fraction got bigger	1	Must be clear reference to win not ‘it’ Do not allow comparing with unlike (e.g. W and L) only unless clearly indicating that W replaced L as ‘majority’ oe $\frac{1}{2}$ or $\frac{1}{4}$ may be degrees Allow error in 2020 win fraction Must be an implied comparison	

[illegible]

					<table><tr><td>No The pie chart in 2020 shows the team won $\frac{1}{4}$</td><td>No comparison stated</td><td>0</td></tr><tr><td>No It went from $\frac{1}{2}$ to $\frac{1}{4}$</td><td>Do not condone 'it' for 'win'</td><td>0</td></tr><tr><td>No It's $\frac{1}{2}$ [in 2019] and now [in 2020] it's $\frac{1}{4}$</td><td>Unclear what 'it's' refers to. Must be clearly WIN</td><td>0</td></tr><tr><td>No They lost half instead of won half</td><td>No marks as don't compare like with like (they could still have won half in 2019)</td><td>0</td></tr><tr><td>No The fraction has gone down to a $\frac{1}{4}$</td><td>Not clearly about wins</td><td>0</td></tr><tr><td>No $\frac{1}{2}$ of the matches lost and only $\frac{1}{4}$ won</td><td>No marks as don't compare like with like</td><td>0</td></tr></table>	No The pie chart in 2020 shows the team won $\frac{1}{4}$	No comparison stated	0	No It went from $\frac{1}{2}$ to $\frac{1}{4}$	Do not condone 'it' for 'win'	0	No It's $\frac{1}{2}$ [in 2019] and now [in 2020] it's $\frac{1}{4}$	Unclear what 'it's' refers to. Must be clearly WIN	0	No They lost half instead of won half	No marks as don't compare like with like (they could still have won half in 2019)	0	No The fraction has gone down to a $\frac{1}{4}$	Not clearly about wins	0	No $\frac{1}{2}$ of the matches lost and only $\frac{1}{4}$ won	No marks as don't compare like with like	0
No The pie chart in 2020 shows the team won $\frac{1}{4}$	No comparison stated	0																					
No It went from $\frac{1}{2}$ to $\frac{1}{4}$	Do not condone 'it' for 'win'	0																					
No It's $\frac{1}{2}$ [in 2019] and now [in 2020] it's $\frac{1}{4}$	Unclear what 'it's' refers to. Must be clearly WIN	0																					
No They lost half instead of won half	No marks as don't compare like with like (they could still have won half in 2019)	0																					
No The fraction has gone down to a $\frac{1}{4}$	Not clearly about wins	0																					
No $\frac{1}{2}$ of the matches lost and only $\frac{1}{4}$ won	No marks as don't compare like with like	0																					
			Total	2																			
36	a		2023 and [Q3 is] lower than in the other years oe	1	<table><tr><td></td><td>Accept summer or "it" etc for Q3 Condone [Year] 3 for [Year] 2023 <u>Examples</u> It didn't increase as much as other years They had the least amount of</td></tr></table>		Accept summer or "it" etc for Q3 Condone [Year] 3 for [Year] 2023 <u>Examples</u> It didn't increase as much as other years They had the least amount of																
	Accept summer or "it" etc for Q3 Condone [Year] 3 for [Year] 2023 <u>Examples</u> It didn't increase as much as other years They had the least amount of																						

					sales. Sales rose but not as much as other years It is lower The sales are lower/est [in 2023] The graph shows less sales of products (BOD) <u>Examiner's Comments</u> This was often correct and many chose 2023 because the Q3 sales were down on other years (this was often poorly expressed, but the intention was marked).
	b		The trend/pattern will continue oe	1	Do not accept references to the weather Do not accept "Sales stay the same" Accept e.g. Sales will increase The pattern stays the same <u>Examiner's Comments</u> Candidates seemed unsure about what was meant by an assumption. Answers such as 'sales went up by £300' were often seen, along with references to the weather. The general impression was that candidates were unfamiliar with interpreting this type of graph.
	c		Repeating pattern	1	Accept any correct pattern that repeats annually Accept

					reference to seasons for Qs e.g. Lower in q2 than q1 or Highest in q3 or Lowest in q4 etc or Sales in q1 or 2 or 4 rise each year Do not accept "Low sales in 2023" etc <u>Examiner's Comments</u> Candidates appeared unsure about annual variation. Many responses said such things as 'it went up and down' or '2022 had the best sales'.
			Total	3	
37	a		35 (mm)	1	<u>Examiner's Comments</u> Most candidates gave the correct reading from the bar chart.
	b		7 : 11 final answer	2	B1 for 35 : 55 Or B1FT for <i>their</i> (a) : 55 or 35 : <i>their</i> 55 Where <i>their</i> 55 is between 50 and 60 inclusive <u>Examiner's Comments</u> Most candidates correctly identified the values of 35 and 55 and wrote them as a ratio. Many were also able to write this in its simplest form, however the common error seen was leaving the ratio as 35 : 55. Some candidates incorrectly simplified the ratio to 6 : 11 or 5 : 9.

					There were also a few candidates that incorrect read the amount of rainfall in March from the bar chart.
	c		50	3	M2 for $70 + \text{their (a)} - \text{their } 55$ or M1 for $70 + \text{their (a)}$ If 0 scored SC1 for 70, 35 and 55 M1 Implied by 105 SC could be seen on the graph or in parts (a) and/or (b) Examiner's Comments Most candidates identified the 3 values needed and these generally came to the correct answer. There were however a few who calculated $70 + 35$ and did nothing further. Only a few were unable to access this part and these often had the correct numbers 70, 35 and 55 shown somewhere in the three parts of the question, for which they were given a mark. Writing on diagrams When reading from diagrams, encourage candidates to write their reading on the diagram and then rewrite it where appropriate in the questions. This will allow them to self-assess their readings from the diagram later and also when checking through questions.
			Total	6	
38			70	3	M2 for $(50 \times 3) - (32 + 48)$ oe or M1 for 50×3 M1 implied by 150

					or for $\frac{32+48+c}{3}$ or better Accept any letter or symbol for missing age <u>Examiner's Comments</u> Candidates struggled to access this question. Trial and improvement was the common method seen, rather than a more direct approach based on an appreciation of how a mean is calculated. The most common misconception was to focus on the numbers given in the question, with the majority interpreting that Charlie was 50; the calculation $32 + 48 + 50$ was consequently often seen, followed by an attempt to divide 130 by 3. Candidates who wrote $3 \times 50 = 150$ (or just went straight ahead and wrote the number 150 without a calculation) generally went on to be given full marks.
			Total	3	
39	a		108	3	M2 for $\frac{72}{360} \times 540$ oe or M1 for $\frac{72}{360}$ oe or $\frac{540}{360}$ oe May be e.g. $72 \div \frac{360}{540}$ or $72 \div 0.66$ to 0.67 or $540 \div 5$ 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 $360 - 72 - 72$

				<u>Examiner's Comments</u> Some good, efficient responses were seen to reach the correct answer to this question. Around a third of candidates gained all marks. The common error was to confuse numbers of students with degrees. It was not uncommon to see weaker responses subtracting 144° from 540 students. The correct answer from incorrect working was seen from some candidates, e.g. $(360 - 72 - 72) \div 2$, again confusing degrees with numbers of students. Exemplar 1 12 A school has 540 students. This pie chart shows the way that all 540 students travel to the school. Each student either walked or cycled or travelled by bus or travelled by car.  (a) Work out how many of the 540 students travel to the school by car. 540 360 72 + 72 = 144 540 - 144 = 216 540 - 216 = 324 324 ÷ 2 = 162 (a) 162 In this response the candidate has worked out 216 degrees but treats it as 216 students when subtracting it from 540.
b	162	3	M2 for $\frac{3}{4} \times (360 - 2 \times 72)$ oe OR $\frac{3}{4} \times (540 - 2 \times \text{their } 108) \times \frac{360}{540}$ oe e.g. $540 - 216 (= 324)$ $\rightarrow 324 \div 4 (= 81)$ $\rightarrow 324 - 81 (= 243)$	

					$\rightarrow 243 \times \frac{360}{540} \text{ or } 243 \div \frac{540}{360} \text{ or } 243 \div 1.5$ $\text{NB } \frac{360}{540} = \frac{2}{3} \text{ and the inverse is often } 1.5$ M1 for $\frac{3}{4} \times []$ oe $[] < 540$ or B1 for 216
					<u>Examiner's Comments</u> This question was answered less well and more than half the candidates scored 0 marks, often showing little understanding of the correct method to be used. Much haphazard working was seen, again often confusing degrees with numbers of students. Many did not attempt to find $\frac{3}{4}$, but divided a number by 3. Very few candidates annotated their working. If they had then they might have made fewer mistakes.
			Total	6	
40	a		45	2	M1 for at least two of 24, 12 and 9 or for attempt to sum <i>their</i> three values May be seen on bar chart <i>their three values MUST be stated</i> <u>Examiner's Comments</u> This was answered correctly by the vast majority of candidates. Those that didn't receive full marks often scored M1 for giving 24 and 12, usually seen in an addition calculation. There were a few candidates that gave one of the bar values as their answer, not interpreting the question.

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					Many different combinations of values were seen in responses to this question. Many candidates were able to find the maximum value of 19, though others instead gave the range 14 as their maximum. Candidates were less successful in finding values to satisfy the other two criteria of a median of 9, and four different prime numbers ≥ 5. Often, they could satisfy one of the criteria, but not both. [5], 9, 9, 19, or [5], 7, 13, 19, or [5], 7, 11, 13 were common partially correct answers.
			Total	3	
42	a		Not used the key oe 8	1 1	e.g. Each circle is 4 students/not 1 student Misinterpreted/Not interpreted the key or reverse: $\frac{1}{2}$ a circle should have been drawn For additional information refer to 2022 November (J56002) Mark scheme Appendix within downloadable additional mark guidance. <u>Examiner's Comments</u> Many candidates were able to access this question. Almost all candidates were able to identify the correct number as 8. Some candidates struggled to explain what 'Harper has done wrong' and instead described how to find the correct answer for Monday.
	b			1	<u>Examiner's Comments</u>

					Most answers were correct.
			Total	3	
43			212.5	4	M1 for 185.5×5 may be implied by 927.5 M1 for 190×6 may be implied by 1140 M1 for <i>their</i> $190 \times 6 - \text{their } 185.5 \times 5$ Alt method e.g. M2 for $(190 - 185.5) \times 5$ M1 for <i>their</i> $(190 - 185.5) \times 5 + 190$ Examiner's Comments Few fully correct answers were seen. Although many started with the correct first steps of multiplying the mean distances by the relevant number of days to reach the total miles, this work was frequently abandoned. Of those who realised that they needed the total number of days many gave the final answer as 1140, from 190×6, without reference to the first 5 days. Others added the two 'miles per day' values together and then divided by 2 showing some understanding of mean but not in this context. Most had no real understanding of what the question was asking, and most candidates seem to consider that mean is always 'add together and divide by how many there are'. Some candidates divided by 5 or 6.
			Total	4	
44	a		16	1	

					<u>Examiner's Comments</u> Most answers were correct.
	b		4	1	<u>Examiner's Comments</u> Most answers were correct.
	c		Bar height 13	1	Condone freehand. Must have sides and a top nearer to 13 than 12 or 14 Width $\pm 2\text{mm}$ by eye <u>Examiner's Comments</u> Most answers were correct.
			Total	3	
45			[127] 148 149 296 in any order With correct working	5	M3 for $4x$ and 592 or for $(180 \times 4 - 127 - 1) \div 4$ A1 for 148 or M2 for a correct algebraic expression and correct constant or for $180 \times 4 - 127 [-1]$ or for $127 + 148 + 149 + 296 = 180 \times 4$ oe or for trials leading to the correct answer or M1 for $127 + x + x + 1 + 2x$ nfw or 180×4 or 720 If 0 or 1 scored, instead award SC2 for 148 149 “correct working” requires at least M2 180×4 can be implied by 720 throughout eg $127 + x + x + 1 + 2x$ and 720; $4x + 1$ and 593 Do not accept x, $2x$ or $x + 1$ as correct algebraic expressions for M2

					296 in any order with no or insufficient working If 0 scored, SC1 for $[x=]148$ Condone e.g. $127 + x + x + 1 + 2x \div 4$ for M1 Mark to candidates advantage <u>Examiner's Comments</u> A variety of approaches were seen leading to the answer. A successful approach by some candidates was to form and solve an equation, others gained success using different approaches including trial and improvement. Many candidates were able to calculate the total as 720 to gain 1 mark. Several candidates did not attempt this question. Some wrote 127, x, $x + 1$ and $2x$ straight onto the answer line with no attempt to show any working.
			Total	5	
46	a		3	1	<u>Examiner's Comments</u> Candidates generally did well on this question. However, common errors were finding the mean, median and range.
	b		10	2	B1 for only 2 and 12 identified <u>Examiner's Comments</u> This part was not as well done as part (a). Occasionally candidates subtracted 3 from 6 (being the first and last numbers in the list) but this was uncommon. The most common error was missing the 2 as the lowest number and subtracting 3 from 12 to give an answer of 9.
			Total	3	
47			2 correct from e.g. Bars are unequal width	2	

			Vertical scale is not linear Vertical axis does not start at 0		B1 for each Both marks may be scored in one sentence Exemplar responses Bars are not the same thickness/width 1 It has to be 3 or 6 lines wide not both 1 June and August have 3 boxes /squares, July has 6 (<i>implies width</i>) 1 July is wider 1 Scale should start at 0 not 5 1 Scale is not linear 1 Difference in frequency is not equal/consistent 1 Scale goes up in 5s then in 10s 1 Scale is inconsistent 1 Bars are different lengths without reference to numbers or x axis 0 Bars are different sizes (<i>no reference to width</i>) 0 July is not the same as the others (<i>no reference to width or equivalent</i>) 0 July is taking 6 columns (<i>no reference to others</i>) 0 July has more boxes/ squares (<i>no reference to width</i>) 0 Frequency axis is labelled wrong 0 Its not spread evenly (<i>what isn't</i>) 0 <u>Examiner's Comments</u> Candidates who gave accepted responses generally identified the width difference, or noticed the scale changed from 5s to 10s, although many stated the graph axis did not start at 0. Some candidates did not read the question properly and discussed what they saw as problems with the experiment, for example 'the shop isn't open the same length every month'. Some incorrect answers referred to the type of mobile phone not being named, the fact that only 3 months were on the graph or stated that the graph did not have a title.
			Total	2	
48	a		30	3	B1 for [median =] 3.5 M1 for <i>their</i> median $\times 10 - 5$ Accept only 30 for 3 marks If 4 (mode) or 3 (mean) or other wrong value from

					1 to 4 used M1 still available. Examiner's Comments Most candidates attempted the question. Many knew that the median was 3.5. Some candidates stated the median was 2, from not ordering the scores and some thought it was 4, being most common. Others found the mean or the total score. Most candidates did not substitute to show $S = 10 \times 3.5 - 5$ but worked in stages showing $10 \times 3.5 = 35$ and then $35 - 5 = 30$. The use of any value between 1 and 4 was credited for a method mark.
	b		At least one from 1, 4, 5, 5 2, 4, 5, 5 3, 4, 5, 5 or one judge awards 1, 2 or 3 oe and 4, 5, 5 [stay the same]	2	B1 for four values in order with median 4.5 with one not from 1 to 5 or for one judge awards 1, 2 or 3 without mentioning 4, 5, 5 Condone inclusion of 4, 4, 5, 5, with another correct list. Accept 1 to 3 for 1, 2 or 3 and condone 4 included e.g. 1 to 4 Accept "the rest stay the same" oe for 4, 5, 5 Examiner's Comments This was found difficult by most candidates and a significant number did not attempt it. Most candidates misunderstood the question. Many checked the calculation and said Taylor was right. Some said Taylor worked it out wrong as they added up to 18, not 40, or they did not get scores that way. A small minority of candidates realised that, as long as the middle numbers were 4 and 5, the score would be the same but did not explain this clearly. A few candidates gave the correct explanation.

			Total	5	
49	a		Correct, labelled pie chart with correct working	6	M2 for $360 - (160 + 60 + 20)$ oe or M1 for $160 + 60 + 20$ AND M1 for $\frac{2}{5} \times \text{their}$ 120 oe A1 for 48 or M1 for $\frac{3}{5} \times \text{their}$ 120 oe A1 for 72 AND B1 for ruled line at 48° B1 for <i>their</i> smaller sector labelled “bike” and larger sector labelled “car” “correct working” requires at least M1M1 and ruled line If there are labelled angles, mark the method that leads to the angles If angles are not shown mark worst method May be implied by 120 May be implied by 240 Mark to the candidate’s advantage <i>Their</i> $120 < 360$ 48 implies M1A1 72 implies M1A1 Tolerance $\pm 2^\circ$ only if correct working seen. Examiner’s Comments This question was well attempted and often resulted in full marks. A small minority didn’t label their sectors or labelled incorrectly. Occasionally the only mark lost was for drawing the line on the pie chart in the wrong place after 48° or 72° seen. Most used a ruler, but some freehand lines, losing this mark, were seen. Those not scoring full marks often gained M2 for finding the remaining 120°. The most common error after this was to divide 120 by 2 and 3, leading to 60° and 40°. Others only did $120 \div 2 = 60$ then assumed the other angle was also 60°. These candidates didn’t consider the unequal aspect of the ratio while some that did gave the two sectors as 70° and 50°. Arithmetic errors when calculating 240° and 120° were

					made by some, however many went on to gain a further method mark for the next step of finding $\frac{2}{5}$ and $\frac{3}{5}$ of their 120° . Others used the ratio to 'count up' to find angles that summed to 120, e.g. 2 : 3, 4 : 6, 40 : 60, etc. rather than dividing by 5. Working out appeared less well set out in this question with some methods scattered all over the page.
	b		Bus	1	<u>Examiner's Comments</u> Generally answered correctly, 160 was seen most commonly in place of a correct response. Train, the median rather than the mode, was sometimes seen and there were a few who did not attempt this part.
			Total	7	
50	a		Correct bar at 54	1	Accept clear intention but do not accept a vertical line to 54 <u>Examiner's Comments</u> Many candidates completed the bar chart correctly using ruled lines. Although widths of the bars weren't always similar to the other four days, they always remained within the gap for Friday, sometimes taking up the full width. It was rare for the scale to be misunderstood with just the occasional bar drawn to a height of 58. Some candidates did not use a ruler and some bars were quite untidy but most provided a clear indication of the correct bar. Occasionally this part was missed although parts (b) and (c) were attempted.
	b		No, not true with valid supporting reason	1	e.g. 100% being the same as all students absent oe e.g. percentage cannot be greater than 100% <u>in this context</u> oe If values are used, they must be correct Any incorrect statement invalidates the mark

				Exemplar responses 1 No because 100% means everyone 1 2 No that would be all of the students and more (<i>this would also score if they hadn't stated 'and more'</i>) 1 3 No There can only be 100% of the students 1 4 No it is over 100% meaning all of them would be absent 1 5 No 150% means all students would be absent (<i>we can condone use of 150% as 'all would be absent'</i>) 1 6 This could not be true as not everyone was absent (<i>could not be true is fine to imply 'no'</i>) 1 7 This could not be true as 150% is 1.5 times more students which is impossible (<i>BOD 'more'</i>) BOD 1 8 No it cannot because 150% is more than the total which isn't possible (<i>BOD 'total' implies students</i>) BOD 1 9 No, that is more students than there is in the school (<i>BOD a % rather than 150 as there are 600</i>) BOD 1 10 No because how can more than 100% be absent (<i>the word absent is referring to the context</i>) BOD 1 11 No because only 50 students were absent (<i>needs reference to all or less than 100%</i>) 0 12 No because 150% of all students would be 90 and there are only 50 absent (<i>should be 900</i>) 0 13 No because it's less than the number of people in the school (<i>interpreted as 150 rather than 150%</i>) 0 14 No, 50/600 isn't 150% (<i>true but doesn't answer the question with reference to 150% >100%</i>) 0 15 No this could not be true as 100% is all the students. There were 10 students still at school on Monday (<i>The 1st sentence alone would score, but the additional incorrect statement loses the mark</i>) 0 All of the following score 0 as they do not refer to the context of the question 16 No, it could only be out of 100% 0 17 No because the percent is out of 100
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				0 18 No because 150% is impossible 0 19 No because 50 is half of 100 so it wouldn't be above 150% 0 20 No there should always be 100% 0 <u>Examiner's Comments</u> Good answers used concise language with a clear understanding that 150% was impossible and reference to the context/numbers of students was made. Common errors in non-scoring statements were: • Wrong interpretation of the graph, i.e. graph showing numbers of students present and/or total number of students taken as 60. • Confusing/interchanging numbers of students with percentage of students. • Answers gave no reference to the context: some showed a clear understanding of 100% and 150% but without reference to context the mark was lost.
	c	7	3	M2 for $\frac{42}{600} \times 100$ oe or M1 for $\frac{42}{600}$ oe or $\frac{n}{600} \times 100$ oe e.g. $42 \div 6$ $n < 60$ <u>Examiner's Comments</u> A real mix of responses. Some candidates used incorrect values, often taking the number of absent students on Tuesday instead of Thursday. Several got as far as $\frac{42}{600}$ but were not sure how to progress. The best responses used equivalent fractions to simplify $\frac{42}{600}$ to $\frac{7}{100}$ Another successful method was calculating $1\% = 6$ and then

					scaling up to 42 = 7%. Numerous candidates misinterpreted the question as calculate 42% of 600. Many who correctly stated 42, subtracted it from 600 rather than dividing to try to find the percentage. There appeared to be very little checking of whether an answer was reasonable.
			Total	5	
51	a	i	10	1	<u>Examiner's Comments</u> This was generally well answered. A few candidates did not read the question carefully enough and gave responses related to the wrong year group. In part (i), a common error was 8, probably from miscounting.
		ii	7	1	
	b		RomCom	1	
	c		20	2	M1 for 3 [+] 2 [+] 5 [+] 7[+] 3 seen May be on graph
	d		4 : 5	3	B1 for 25 or (45 – <i>their</i> 20) M1 for <i>their</i> 20 : <i>their</i> 25 OR M2 for $\frac{4}{9} : \frac{5}{9}$ seen or M1 for $\frac{20}{45} : \frac{25}{45}$ oe seen If 0 scored, SC1 for answer 5 : 4 <i>Their</i> Yr 10 from (c) <i>Their</i> 25 is any value from 12 to 44 May be on answer line For M1 ratio must be seen and not implied from a “simplified” version 20 : 25 implies B1 M1 25 : 20 implies B1 oe 0.444[...] : (0.555 to 0.556) <u>Examiner's Comments</u> Some candidates wrote a ratio of 20 : 45 and scored zero marks.
			Total	8	
52	a		$\frac{90}{360}$ oe fraction	1	

					Expect $\frac{1}{4}$ but ignore attempts to cancel initially correct fraction but not convert to decimal or percentage Answer 0.25 after $\frac{1}{4}$ seen scores 0 <u>Examiner's Comments</u> Candidates here often had the correct answer, though a considerable number of 'thirds' were seen (presumably as it was one section from 3 sections).
	b		Yes oe and [in 2020] they won more matches (or double the number of matches) than [in 2019] oe or The win fraction went up to $\frac{1}{2}$ oe [from $\frac{1}{4}$ oe] The win fraction got bigger	1	Must be clear reference to win not "it" Do not allow comparing with unlike (e.g. W and L) only unless clearly indicating that W replaced L as majority" oe $\frac{1}{2}$ or $\frac{1}{4}$ may be degrees Allow error in 2020 win fraction Must be an implied comparison <u>Examiner's Comments</u> In this part, stronger candidates clearly stated that the number of wins had gone from $\frac{1}{4}$ to $\frac{1}{2}$ thus showing improvement, but some mixed outcomes and did not compare like with like, such as saying that losses were $\frac{1}{2}$ and now wins are $\frac{1}{2}$.
			Total	2	
53	a		8	2	B1 for only 1 and 9 identified

	b		5	2	M1 for $(6 + 9 + 2 + 3 + 9 + 1) \div 6$ Condone missing brackets for M1 Examiner's Comments Some students confused the range and mean. A small number gave the median rather than the mean.
			Total	4	
54	a		Correct reason	1	e.g. all could be children oe all could be adults oe too small a sample vary the time various age groups Examiner's Comments A common error in this part was to assume that this survey was just about 15 year olds, or looking at a sample of people 'around' 15. Lots of scoring responses were along the lines of them being in school at this time. Incorrect responses referred to playing video games at that time rather than surveying video game use. Few mentioned the sample size being low. Some incorrectly thought that the sample would be unreliable if there were any people who didn't play computer games in it, whilst others referred to not asking everyone.
	b		Any three from: Larger sample size Vary the time of day/day Ensure equal numbers [of older and younger people are asked] Vary the location	3	B1 for each isw incorrect reasons Examiner's Comments In this part, few gave 3 valid reasons. The main scoring responses suggested changing the time of the survey to after

					school or at a weekend. A minority mentioned equal amounts in each age group, similarly, increasing the sample size. Quite a few referred to using an online survey. Those that did identify that obtaining the sample was the nub of the question sometimes made the error of only wanting a sample with people who played lots of games/went to game stores or suggested going to a school; they mostly did not consider that this would bias the sample. Other non-scoring responses included collect basic information such as age and hours played or to present the data once collected (e.g. in a graph or chart). Other suggestions involved changing the journalist's survey parameters (e.g. survey more age ranges (not just 2)), which wasn't answering the question regarding sampling.
			Total	4	
55	a		Four correct plots (70, 86) (44, 60) (37, 48) (38, 50)	2	B1 for 2 or 3 correct plots Overlay gives guidance, tolerance $\pm\frac{1}{2}$ small square <u>Examiner's Comments</u> Although many plotted all four points accurately, a significant number confused the x and y coordinates (although not consistently, as often just (38, 50) would be reversed). A few plotted points within the squares, rather than on gridlines.
	b		Positive	1	Ignore embellishments <u>Examiner's Comments</u> A common error in this part was to state 'negative'. Rather than just stating 'positive', there were many that described the relationship with comments such as 'it's going up', 'the higher you got in Jan the higher you'll

					get in Feb' or 'they did better in February'.
	c	i	Circles (30, 66) only	1	Accept any clear indication <u>Examiner's Comments</u> In part(i), (70, 86) was the most commonly given incorrect answer. Many circled the table rather than the point on the scatter graph, which showed they understood the concept of the question even if they hadn't read the instruction to circle the point on the graph.
		ii	120	3	$\text{M2 for } \frac{66-30}{30} [\times 100] \text{ oe}$ $\text{or for } \frac{66}{30} \times 100 [-100] \text{ oe}$ $\text{or M1 for } \frac{66}{30} \text{ oe or}$ $\text{for } 66 - 30 \text{ oe}$ For M2 and M1 FT <i>their</i> (i), point <u>must</u> be chosen for FT (table or graph) M2 implied by 1.2 or 220 M1 implied by 2.2 or 36 <u>Examiner's Comments</u> Only a few candidates had success with to part (ii). A small number subtracted their two values and gained M1. For those that recognised a division was required, 66 was usually in the denominator instead of 30. Of the few that achieved the correct result, often a 'build up' method of percentages was used rather than a division, e.g. 10% of 30 = 3, 20% = 6, 100% = 30 so 36 = 100 + 20, etc.
	d		No and line of best fit should not extend beyond data provided oe	1	eg only have data up to 70 marks, No one scored that high [so the trend may not continue] He would need to

					extrapolate beyond the line of best fit Do not accept eg the graph only goes up to 90 for the second test
					<u>Examiner's Comments</u> It was very rare to see a scoring statement in this part. The majority just referred to how he could have done better or worse on the day, or wrote 'yes, it's a good estimate'. Some referred to the 'lack of correlation, therefore it wouldn't be a good estimate' rather than commenting on a score of 79 being beyond the given data values.
			Total	8	