1(a)	15 × 24 or 360 and 40 × 76 or 3040 and 55 × 52 or 2860 and 75 × 48 or 3600 or 9860	M1	allow one incorrect midpoint
	(their 360 + their 3040 + their 2860 + their 3600) ÷ 200 or 9860 ÷ 200	M1dep	condone bracket error seen eg 360 + 3040 + 2860 + 3600 ÷ 200
	49.3	A1	accept 49 if full working shown using correct midpoints
	Additional Guidance		
	Four values or products with three correct from 360, 3040, 2860 and 3600 implies the first mark and could be used to score up to M2		
	Correct products seen in the table or working but a different method shown in the working lines eg 200 ÷ 4		M0
	Ignore attempts to convert to minutes and seconds after 49.3 seen eg 49 min 18 s or 49 min 30 s		
	49.3 in working with answer $30 \leqslant t < 50$		M2A0

1(b)	$24 \div 30$ or 0.8 or $76 \div 20$ or 3.8 or $52 \div 10$ or 5.2 or $48 \div 30$ or 1.6 or four frequency densities in correct proportion	M1	implied by a correct bar eg 8 and 38 and 52 and 16
	At least three of 0.8 and 3.8 and 5.2 and 1.6	M1dep	implied by at least three bars in correct proportion
	At least 3 bars in correct proportion with matching scale on vertical axis or at least 3 bars in correct proportion with a matching key	M1dep	
	Fully correct histogram with scale on vertical axis or a key	A1	$\pm\frac{1}{2}$ small square ignore frequency polygon if included
	Additional Guidance		
	Allow up to M2 even if not subsequently used		
	Correct bars must have correct widths		

2	**Alternative method 1**		
	102×68.5 or 6987 or 85×72.4 or 6154 or 13 141	M1	values may be seen by the table
	$\frac{102 \times 68.5 + 85 \times 72.4}{102 + 85}$ or $\frac{13\,141}{187}$ or 70.2(7…) or 70.3	M1dep	oe
	70.2(7…) and Yes or 70.3 and Yes	A1	
	Alternative method 2		
	102×68.5 or 6987 or 85×72.4 or 6154 or 13 141	M1	values may be seen by the table
	$(102 + 85) \times 70$ or 187×70 or 13 090	M1	oe
	13 141 and 13 090 and Yes	A1	
	Additional Guidance		
	Yes may be implied eg $70.27 > 70$		M1M1A1
	M1 may be awarded for correct work, with no or incorrect answer, even if this is seen amongst multiple attempts		

Q	Answer	Mark	Comments
3	$6 \times 10 - (12 + 7 + 15 + 3)$ or $60 - 37$ or 23	M1	implied by two numbers with a total of 23 eg -11 and 34
	Two positive numbers with a total of 23	A1	
	Two positive numbers which make the range of the list 19	B1	eg a and 22, where $3 \leqslant a \leqslant 22$
	Additional Guidance		
	2 and 21 is the only fully correct answer		M1A1B1
	11.5 and 11.5		M1A1B0
	1 and 22		M1A1B0
	0 and 23		M1A0B0

Q	Answer	Mark	Comments
4	**Alternative method 1**		
	90×5 or 450 or $\frac{72+83+88+97+x}{5}$ or $\frac{340+x}{5}$	M1	oe any letter or symbol
	$90 \times 5 - 72 - 83 - 88 - 97$ or $90 \times 5 - 340$ or $72 + 83 + 88 + 97 + x = 90 \times 5$ or $340 + x = 90 \times 5$	M1dep	oe any letter or symbol equations must have fraction eliminated
	110	A1	
	Alternative method 2		
	Trial of any value with mean correctly evaluated	M1	also allow if given to the next or previous integer eg1 trial of 100 $\frac{72+83+88+97+100}{5} = 88$ eg2 trial of 78 $\frac{340+78}{5} = 83$ (or 84 or 83.6) ignore trials with mean not evaluated or incorrectly evaluated
	Trial of 110 with mean evaluated to 90	M1dep	eg $\frac{72+83+88+97+110}{5} = 90$ this mark implies M1M1
	110	A1	

4 cont	**Alternative method 3**		
	$\frac{72+83+88+97}{4}$ or $\frac{340}{4}$ or 85	M1	oe
	their 85 + 5 × (90 – their 85) or their 85 + 5 × 5 or their 85 + 25	M1dep	oe 90 + 4 × (90 – their 85)
	110	A1	
	Alternative method 4		
	$\frac{72+83+88+97}{5}$ or $\frac{340}{5}$ or 68	M1	oe
	5 × (90 – their 68) or 5 × 22	M1dep	oe
	110	A1	
	Alternative method 5		
	(90 – 72) + (90 – 83) + (90 – 88) + (90 – 97) or 18 + 7 + 2 – 7 or 20	M1	oe eg (72 – 90) + (83 – 90) + (88 – 90) + (97 – 90) or 90 × 4 – 72 – 83 – 88 – 97 or –18 – 7 – 2 + 7 or –20
	90 + their 20	M1dep	oe eg 90 – their –20
	110	A1	
	Additional Guidance		
	M1 may be awarded for correct work with no, or incorrect answer, even if this is seen amongst multiple attempts		
	Embedded 110 scores M1M1A0 using Alt 2 (even if a different answer is given)		
	Condone eg Alt 3 72 + 83 + 88 + 97 ÷ 4 No further marks unless recovered		M1
	Alt 5 1st M1 Subtractions must be consistent		
	Condone 110% for 110		

Q	Answer	Mark	Comments
5	**Alternative method 1 – algebra based on Sunita's age**		
	5×3 or 15	M1	may be implied by their algebraic total of the three ages being divided by 3
	$x - 1$ or $2x$ or $4x - 1$	M1	oe expressions any letter throughout
	x + their $(x - 1)$ + their $2x$ = their 15 or $4x - 1$ = their 15	M1dep	oe equation eg $\frac{x+x-1+2x}{3} = 5$ dep on M1M1
	$(x =)$ 4	M1dep	correct solution to their equation if the solution has a decimal part allow truncation or rounding to the nearest whole number
	8	A1	
	Alternative method 2 – algebra based on Joel's age		
	5×3 or 15	M1	may be implied by their algebraic total of the three ages being divided by 3
	$\frac{y}{2}$ or $\frac{y}{2} - 1$ or $2y - 1$	M1	oe expressions any letter throughout $2y - 1$ must not come from $y + y - 1$
	y + their $\frac{y}{2}$ + their $(\frac{y}{2} - 1)$ = their 15	M1dep	oe equation eg $\frac{y+\frac{y}{2}+\frac{y}{2}-1}{3} = 5$ dep on M1M1
	$2y$ + their y + their $(y - 2) = 2 \times$ their 15 or $4y - 2 = 30$ or $2y - 1 = 15$	M1dep	their equation with no denominator
	8	A1	

5 cont	**Alternative method 3 – trial and improvement**		
	5×3 or 15	M1	may be implied by their total of the three ages being divided by 3
	Trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1	eg $2 + 1 + 4 = 7$ or $(2 + 1 + 4) \div 3$ condone missing brackets
	Second trial of three numbers which fit the criteria, with either their sum correctly evaluated or their sum divided by 3	M1dep	dep on previous M1 eg $3 + 2 + 6 = 11$ or $(3 + 2 + 6) \div 3$ condone missing brackets
	4, 3 and 8 selected as their final combination	M1dep	any order implies M4
	8	A1	
	Additional Guidance		
	Up to M4 may be awarded for correct work seen in multiple attempts even if not subsequently used		
	Correct expressions, but the sum of the three ages is equated to 5 eg $4x - 1 = 5$		M0M1M0M0A0
	In alt 1, the correct value of x or the correct age for Joel for their two terms for Beth and Joel, with one correct, implies the first 4 marks eg x and $x + 1$ and $2x$, with $x = 3.5$ or answer 7		M1M1M1M1A0
	In alt 2, the correct value of y for their two terms for Sunita and Beth, with one correct, implies the first 4 marks eg y and $\frac{y}{2}$ and $(\frac{y}{2} + 1)$, with $y = 7$ or answer 7		M1M1M1M1A0
	In alt 1 and alt 2, condone missing brackets in equations if not recovered for up to M1M1M1 eg $x + x - 1 + 2x \div 3 = 5$ not recovered		M1M1M1M0A0

Q	Answer	Mark	Comments
6	12 24 30 41	B2	B1 their median = 2 × their LQ with the first eight values in order and their UQ and their last number ⩾ their median or their UQ = 2.5 × their LQ with the first ten numbers in order and their last number ⩾ their UQ or their range = 2 × their interquartile range with all values in order
	Additional Guidance		
	Take the boxes to be the LQ, median, UQ and highest value in that order		
	Decimal values can score up to B1 eg 11.5 23 29 40 has median = 2 × LQ		B1
	Ignore blank boxes for B1		
	If all boxes are blank, mark the working lines		

Q	Answer	Mark	Comments
7(a)	12 × 66 or 792 and 17 × 32 or 544 and 30 × 15 or 450 and 70 × 10 or 700	M1	oe implied by 2486 may be seen by the table allow one product or fx value to be incorrect
	(their 792 + their 544 + their 450 + their 700) ÷ 123 or 2486 ÷ 123	M1dep	oe eg $\frac{792+544+450+700}{66+32+15+10}$ condone bracket error if working seen eg 792 + 544 + 450 + 700 ÷ 123
	20.2(1…)	A1	allow 20.20 if M2 seen and no errors
	Additional Guidance		
	Four values with three correct from 792, 544, 450, 700 can score up to M2 if they add and divide by 123		
	Correct products or values seen but a different method used eg 123 ÷ 4		M0M0
	20.2(1…) in working with answer given as the interval $20 \leqslant p < 40$		M2A0
	Ignore any references to statement B eg £20.21 which makes B wrong		M2A1
	Condone $20.\dot{2}$, $20.\dot{2}\dot{1}$ etc for $20.\dot{2}1138\dot{}$		
	Do not allow rounding of any of their 4 values in the second mark eg 792 544 450 700 (800 + 544 + 450 + 700) ÷ 123		M1 M0

Q	Answer	Mark	Comment
8(a)	1.5 × 6 or 9 or 3.5 × 4 or 14 or 5 × 2 or 10 or 4.5 × 4 or 18 or 2.5 × 4 or 10	M1	oe values 9, 14, 10 or 18 must be in the correct row in the table or linked to the correct bar on the histogram
	1.5 × 6 × 3 or 9 × 3 or 27 or 3.5 × 4 × 8 or 14 × 8 or 112 or 5 × 2 × 11 or 10 × 11 or 110 or 4.5 × 4 × 14 or 18 × 14 or 252 or 2.5 × 4 × 18 or 10 × 18 or 180 or 681	M1dep	oe values 27, 112, 110, 252 or 180 must be in the correct row in the table
	(their 27 + their 112 + their 110 + their 252 + their 180) ÷ (their 9 + their 14 + their 10 + their 18 + their 10) or 681 ÷ 61	M1dep	oe full correct method eg (their 27 + their 112 + their 110 + their 252 + their 180) ÷ 61
	[11.16, 11.2]	A1	accept 11 with M3 scored and no errors

	Additional Guidance	
	Up to M2 may be awarded for correct work with no answer, or incorrect answer, even if this is seen amongst multiple attempts	
8(a) cont	<table><tr><th>Time, x, (hours)</th><th>Frequency</th><th>Midpoint</th><th></th></tr><tr><td>$0 \leqslant x < 6$</td><td>9</td><td>3</td><td>27</td></tr><tr><td>$6 \leqslant x < 10$</td><td>14</td><td>8</td><td>112</td></tr><tr><td>$10 \leqslant x < 12$</td><td>10</td><td>11</td><td>110</td></tr><tr><td>$12 \leqslant x < 16$</td><td>18</td><td>14</td><td>252</td></tr><tr><td>$16 \leqslant x < 20$</td><td>10</td><td>18</td><td>180</td></tr></table>	M1M1
	<table><tr><th>Time, x, (hours)</th><th>Frequency</th><th>Midpoint</th><th></th></tr><tr><td>$0 \leqslant x < 6$</td><td>9</td><td>3</td><td>27</td></tr><tr><td>$6 \leqslant x < 10$</td><td>16</td><td>8</td><td>128</td></tr><tr><td>$10 \leqslant x < 12$</td><td>10</td><td>11</td><td>110</td></tr><tr><td>$12 \leqslant x < 16$</td><td>20</td><td>14</td><td>280</td></tr><tr><td>$16 \leqslant x < 20$</td><td>10</td><td>18</td><td>180</td></tr></table>	M1M1
	<table><tr><th>Time, x, (hours)</th><th>Frequency</th><th>Midpoint</th><th></th></tr><tr><td>$0 \leqslant x < 6$</td><td>1.5</td><td>3</td><td>4.5</td></tr><tr><td>$6 \leqslant x < 10$</td><td>3.5</td><td>8</td><td>28</td></tr><tr><td>$10 \leqslant x < 12$</td><td>5</td><td>11</td><td>55</td></tr><tr><td>$12 \leqslant x < 16$</td><td>4.5</td><td>14</td><td>63</td></tr><tr><td>$16 \leqslant x < 20$</td><td>2.5</td><td>18</td><td>45</td></tr></table> $(4.5 + 28 + 55 + 63 + 45) \div (1.5 + 3.5 + 5 + 4.5 + 2.5)$ $= 195.5 \div 17 = 11.5$	M0M0 M0A0

Q	Answer	Mark	Comment
8(b)	Valid reason	B1	eg the data is grouped or the exact values are not used or the midpoints are estimates
	Additional Guidance		
	Because we are using midpoints		B1
	Midpoint is an average		B1
	There are no raw data		B1
	Numbers are rounded		B0
	There are no data to use		B0
	The answer is a decimal		B0
	Valid reason with an irrelevant statement		B1

Q	Answer	Mark	Comments
9	A correct comparison of the average age of the two clubs	B1	eg the average (age) of the cyclists was higher/older the median (age) of the swimming club was lower/younger, (so the average was lower/younger)
	A correct comparison of the consistency of the ages of the two clubs	B1	eg the cycling club has more consistent ages the interquartile range of the swimming club was higher, so they were less consistent in age
	Additional Guidance		
	Statements must be comparisons eg1 (the average age at) the cycling club was higher eg2 (the average age at) the cycling club was high		B1 B0
	Statements reversed		B0
	Do not allow incorrect values supporting statements		
	Ignore non-contradictory statements with correct statements		
	Average age statements		
	The swimming club are (8.5 years) younger (on average)		B1
	Cycling club members are (8.5 years) older (on average)		B1
	Younger people prefer swimming (to cycling)		B1
	Young people prefer swimming (to cycling)		B0
	Average age has 8.5 years difference		B0
	The cycling club has more older people		B0

Q	Additional Guidance cont	
	Consistency statements	
	The cycling club is more consistent / has better consistency	B1
	There is a smaller (interquartile) range for cycling, so it's more consistent	B1
	Ages of the cycling club are closer together	B1
	Consistency at the cycling club is bigger	B1
	Consistency at the cycling club is smaller	B0
	More people are in the same age group in the cycling club	B0
	The difference in interquartile range is 2.7	B0
	The swimming club had a higher (interquartile) range	B0
	The swimming club had a higher range of ages	B0
	More of an age gap / age range in the swimming club than the cycling club	B0

Q	Answer	Mark	Comments
10	15×7.2 or 108 **and** 18×7.6 or 136.8 **and** 7×8 or 56	M1	oe implied by 300.8 allow one product or fx value to be incorrect
	$(108 + 136.8 + 56) \div 40$ or $300.8 \div 40$ or $\frac{188}{25}$	M1dep	oe do not allow if any exact fx or Σfx value is approximated
	7.52	A1	accept 7.5 if 7.52 in working lines with no incorrect method
	Additional Guidance		
	M1 may be awarded for correct work with no answer or incorrect answer, even if this is seen amongst multiple attempts		
	15×7.2 18×7.6 7×8 $(108 + 137 + 56) \div 40$ (fx value 137 is approximated)		M1 M0
	$108 + 136.8 + 56 = 300.8$ $300 \div 40$ (Σfx value 300 is approximated)		M1 M0
	M1dep Missing brackets must be recovered eg $108 + 136.8 + 56 \div 40$ not recovered		M1M0
	7.52 in working with answer $7.4 \leqslant d < 7.8$		M2A0