

Question		Answer	Marks	Part Marks and Guidance	
1	(a)	Cfs [2, 12], 30, 42, 47, 50 soi	1	May be implied by plots at correct heights	
		Points plotted at correct endpoints [3, 5], 10, 15 etc	1	FT for ascending graph only	
		Points plotted at correct heights, FT one error in cf	1		
		all 7 points joined with smooth curve or straight line segments	1	FT for ascending graph only	
	(b)	Marika has shorter average time	1 dep	dep on valid reason	0 in this part if their graph is not increasing, unless there is evidence of linear interpolation of table the last two marks are both obtainable from an increasing graph in part (a) plotted at midpoints, with corresponding LQ and UQ if shown condone both sets of correct endpoints and statement P's range larger, oe for IQR
Marika med 8 – 9 Paul med 12.0	1	values for both M and P must be shown; if 0, allow SC1 for correct conclusion with values for both but slight error in one			
Marika has more consistent times	1 dep	dep on valid reason			
Marika range = 25 (or less with reason) Paul range = [29.2 – 3.3 =] 25.9 or Marika IQR = 7.4 to 8.35 Paul IQR = [19.2 – 7.6 =] 11.6 to 11.75	1	values for both M and P must be shown; if 0, allow SC1 for correct conclusion with values for both but slight error in one P range accept 3.25 to 3.35 and 29.15 to 29.2 M LQ accept 5.05 to 5.3 M UQ accept 12.7 to 13.4 P LQ accept 7.5 – 7.6 P UQ accept 19.2 – 19.25			

2	(a)	(i)	Median at 58.5 to 59	1	Accept full or dashed	Allow median mark bod if no box just line in correct position
			Box with LQ at 56.5 to 57 and UQ at 61.5 to 62.5	1		
			Whiskers with lower end at 45 to 46.5 and upper end at 68	1		
		(ii)	No + women have smaller IQR oe or Yes + women range larger with acceptable values stated	2	W IQR accept 4.5 to 6 or FT W range accept 21.5 to 23 or FT M1 for correct range or IQR for women seen or FT their boxplot (M0 if both used in comment and one incorrect) 0 if also reference to median in comment, otherwise ignore median found (some candS finding all 3 stats for women before commenting)	Accept relevant stats shown by diagram if no other stats stated Allow FT from one error in relevant plot in box plot for both marks; also allow correct if wrong/no box plot (may go back and use cf diagram)
	(b)		2346	2	M1 for 39 m 6 s or for 12959 or 15305 [s]	

4	(a)	Median at 170.5 - 172 Box with LQ at 155 - 156 and UQ at 178 - 178.5 Whiskers with lower end at 140 - 141 and upper end at 184.5 - 185	1 1 1	Accept full or dashed Allow BOD if UQ possibly slightly greater than 178.5 but it must clearly be less than 179	Allow median mark BOD if no box just line in correct position															
	(b)	40-44 took longer on average And correct medians (or differences) Range used in appropriate comment (and similarly for IQR) Correct times for <i>their</i> choice	B1 B1 B1 B1	For both comment marks to be earned, at least one comment must mention time/length of time Allow mention of median or figures for median to imply 'on average' B0 if average associated with spread or with mean Allow this B1 if values for median correct even if called 'mean' B0 for just 'spread' without evidence of which measurement used from words or times	Accept these values (may be seen by diagrams): <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>18-39</th> <th>40-44</th> <th>diff</th> </tr> </thead> <tbody> <tr> <td>median</td> <td>172.5</td> <td>191.5-192.5</td> <td>19-22.5</td> </tr> <tr> <td>range</td> <td>43-45.5</td> <td>49.5-50.5</td> <td>4-7</td> </tr> <tr> <td>IQR</td> <td>21.5-24</td> <td>9.5-10.5</td> <td>11-15</td> </tr> </tbody> </table> Allow comment re: differences No FT from wrong box plot for second B1 for median, etc Comments may be in either order – comment 1 does not have to be about average		18-39	40-44	diff	median	172.5	191.5-192.5	19-22.5	range	43-45.5	49.5-50.5	4-7	IQR	21.5-24	9.5-10.5
	18-39	40-44	diff																	
median	172.5	191.5-192.5	19-22.5																	
range	43-45.5	49.5-50.5	4-7																	
IQR	21.5-24	9.5-10.5	11-15																	

Question		Answer	Marks	Part marks and guidance	
5	(a)	<p>Midpts 25, 35, 45... seen or implied</p> <p>$f \times x$ attempted</p> <p>(<i>Their</i> sum of $f \times x$) \div 30 so</p> <p>43.3(3...)</p>	<p>M1</p> <p>M1</p> <p>M1</p> <p>A1</p>	<p>For 3 or more correct; need not be used</p> <p>Sum seen or at least 3 products seen FT <i>their</i> 'midpoints'; <i>their</i> 'midpoints' need to be in the correct class eg correct products are 75, 245, 585, 330, 65</p> <p>If correct: $1300 \div 30$</p> <p>Allow A1 for 43 if correct method seen</p> <p>Allow B4 for 43.3(3...)</p> <p>SC2 for 38.3(3...) or for 48.3(3...)</p>	<p>eg may be seen by table</p> <p>eg allow 2nd M1 for use of endpoints not midpoints; 1300 implies first two Ms; 1450 and 1150 imply MOM1; working for 2nd M1 may be by table</p> <p>First two M1s may be earned for correct work seen even if not then used in the final answer</p> <p>May be earned even if their 'midpoints' are not in the correct class eg Midpoint used as 25 throughout earns MOMOM1 (<i>their</i> $fx = 75, 175, 325$ etc then $750 \div 30$)</p> <p>Common with Foundation</p>
	(b)	(i)	48	1	
		(ii)	27	2	M1 for 36 or 63 or both; may be on diagram

6	(a)		18.2	4	<p>nfw</p> <p>M1 for midpoints 12.5, 17.5 etc (at least 3 correct) soi</p> <p>M1 for <i>their</i> 'midpoints' \times freq attempted soi sum seen or at least 3 products seen FT <i>their</i> 'midpoints'</p> <p>M1 for <i>their</i> sum of $f \times x \div 50$</p> <p>Allow A1 for 18 after correct method seen</p> <p>Allow SC2 for 20.7 and 15.7 (correct answers from endpoints used)</p>	<p>eg may be seen by table</p> <p>eg at least 3 of 175, 350, 247.5, 137.5 or total 910</p> <p>Working may be by table</p> <p>At least 3 midpoints must be in the correct group</p> <p>If correct: $910 \div 50$</p> <p>eg allow 2nd and 3rd M1s for use of endpoints not midpoints</p> <p>First two M1s may be earned for correct work seen even if not then used in the final answer</p> <p>Following use of 5 as x throughout, allow MOMM1 for reaching 250/50</p>
	(b)	(8	1		
		(ii)	21 to 21.5	1		
		(iii)	9.5 to 10.8	2	<p>nfw</p> <p>M1 for [UQ] 26.5 to 27.3 or for [LQ] 16.5 to 17</p>	<p>eg 0 for $\frac{1}{4} \times 40 = 10$</p> <p>eg M1 for answer of 27</p>

7	(a)	(12	1		
		(ii)	68 to 74	2	M1 for [UQ] 210 to 216 or [LQ] 138 to 144	
	(b)	(i)	Delta + [larger] median Values: Delta 190 (± 2) compared with median for Pellow 178 to 184	1 1	condone Delta + [larger] average only if correct figures for at least one median shown	condone 'medium' but not 'mean' instead of 'median' for this first mark eg Delta's median is 10g more is not sufficient for this second mark without values shown
		(ii)	Pellow + smaller IQR oe Values: Delta IQR 98 (± 2) compared with Pellow FT	1 1FT	cao FT (a)(ii) If 0 in this part, allow SC1 for 'Either + ranges same'	condone Pellow + lower IQR; no FT for this first mark 0 for just 'Pellow does not vary as much' oe since Pellow IQR already stated in (a)(ii) we do not require it to be restated here

8	(a)		Longest time at 28.7	1	Calculations seen or correct plots, for first two marks; ignore subsequent plots if calculations seen	Use overlay	
			UQ at 16.7	1			
			Shortest time (7.7), LQ (12.7) and median (14.4) plotted correctly	1			Plots must be in correct squares, condoning on their gridlines
			A complete box plot	1			With box, whiskers and median line
	(b)	(i)	Yes/True: median for 2009 = 13 to 13.5	1	Allow times for 2010 not quoted since given in (a), but if quoted, must be correct (14.4)	See exemplar comments	
					Accept 'Yes they took 0.9 to 1.4 hours longer in 2010'	Accept median further to right in 2010	
						Comments must make the year plain, but bod where correct values implies which year	

		(ii)	No/False: range for 2009 = 12.5 to 13.5 or IQR for 2009 = 2.6 to 3.2	1	<p>Allow times for 2010 not quoted since given in (a), but if quoted, must be correct (range = 21.0, IQR = 4.0)</p> <p>May refer to length of box instead of IQR or to length of box plot instead of range</p> <p>0 for just 'false since range is larger in 2010' oe; evidence in figures or in referring to size of box plot is needed</p>	<p>See exemplar comments</p> <p>Accept eg 'No, box for 2010 is longer'</p> <p>For box plot accept 'wider/longer' but not 'spread out' or 'varied' without values</p> <p>Comments must make the year plain, but bod where correct values implies which year</p>
		(iii)	Can't tell oe or box plots give no information about numbers of swimmers	1		<p>See exemplar comments</p> <p>Condone 'no we don't know' etc</p>

9	(a)		Median line correct	1	Accept full or dashed	Use overlay
			Ends of box correct and box drawn	1	The lines at 5.1 and 10.1 must be within the correct square and showing 'daylight' between it and the boundaries; others to be touching the gridlines	Ignore boxplot for opponents also drawn
			Endpoints and whiskers correct, and no box except from LQ to UQ	1		Ignore line at 6 – may have been used for (b)(ii) 5 crosses drawn – award 0; 5 verticals drawn – can just get 1 for the median if correct
(b)	(2	1			

		<p>(ii) Opponents scored more [runs on average] oe</p> <p>Medians 7.6 and 8 to 8.1 shown in either comment</p> <p>Ranges 5.9 for A and estimate of 6 to 7 for opponents shown in either comment</p> <p>‘Spread about the same’ or ‘more spread out for opponents’ (with some evidence of attempt at range)</p>	<p>1</p> <p>1 Indep</p> <p>1 Indep</p> <p>1</p>	<p>Accept ‘opponents had larger median’ oe Accept ‘medians for A and opponents are similar’ oe No mark for comment for average if spread is clearly associated with average as well, but allow reference to UQ and LQ values in addition to median</p> <p>Or team A median 0.4 to 0.5 smaller oe</p> <p>Or IQR 3.3 for A and 1.9 to 2.2 for opponents shown in either comment</p> <p>Or results for A are more spread out (with some evidence of attempt at IQR)</p> <p>After acceptable comment and/or correct pair of values about range or IQR, ignore extra comments/values about spread but do not ignore about median</p>	<p>No FT for ‘team A average was greater’ from wrong median(s)</p> <p>Condone ‘medium’ Condone ‘box is higher’ if median also referred to</p> <p>For spread need to see evidence of whether they are looking at range or IQR before the comment mark can be awarded</p> <p>Condone ‘lower spread’ as meaning ‘smaller spread’</p> <p>Do not award any marks for a comparison of just one class or ‘end’</p> <p>See appendix for exemplars</p>
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10	(a)	5	1		
	(b)	7 points plotted correctly Joined with smooth curve or line segments, within 2 mm of their plots	1 1FT	Tolerance 1 mm Ignore additional plotted points Ignore to the left of 34 and then allow FT for curve through at least 10 of their remaining points i.e. allow to miss one point or one section not drawn	The centre of their plot should be within or touching the circle on overlay Curve not too thick and not more than two 'double line' or feathered sections e.g. can allow curve mark for last FT section not joined
	(c)	(i) 35.9 t 6	1	Do not accept inequality e.g. $t \leq 36$	[35.9 from condoning reading off at 47.5 not 48]
		(ii) 38.1 8.5 - 34.7 to 35 3.1 to 3.8	M1 A1	Allow B2 for 3.1 to 3.8 www (check graph that readings have been not been taken at incorrect quartiles e.g. must not come from reading UQ at 75) After 0 scored, SC1 for UQ = 38.1 to 38.5 or LQ = 34.7 to 35	Not just for these values seen – must be associated with LQ or UQ e.g. on graph or in subtraction
	(d)	[00:] 35.7 seconds	2	B1 for 35.7 seen or for seconds with another answer of between 10 and 40;	accept s or sec[s] for seconds