		T	1
1 (i)	Mean = $\frac{180.6}{12}$ = 15.05 or 15.1	B1 for mean	
	$S_{xx} = 3107.56 - \frac{180.6^2}{12}$ or $3107.56 - 12$ (their 15.05) <sup>2</sup> =	M1 for attempt at $S_{xx}$	
	(389.53)		3
	$s = \sqrt{\frac{389.53}{11}} = 5.95$ or better	A1 cao	
	NB Accept answers seen without working (from calculator)		
(ii)	$\overline{x} + 2s = 15.05 + 2 \times 5.95 = 26.95$	M1 for attempt at either	
	$\overline{x} - 2s = 15.05 - 2 \times 5.95 = 3.15$	M1 for both	
	So no outliers	A1 for limits and	
		conclusion FT their	3
		mean and sd	
(iii)	New mean = $1.8 \times 15.05 + 32 = 59.1$	B1FT	
	New $s = 1.8 \times 5.95 = 10.7$	M1 A1FT	3
(iv)	New York has a higher mean or 'is on average' higher (oe)	E1FT using ${}^{0}$ F ( $\overline{x}$ dep)	
	New York has greater spread /range /variation or SD (oe)	E1FT using ${}^{0}$ F ( $\sigma$ dep)	2
(v)	The state of the s	( o )	
	Upper bound (70) 100 110 120 150 170 190	B1 for all <b>correct</b>	
		cumulative frequencies	
	Cumulative frequency (0) 6 14 2 45 4	(may be implied from	
		graph). <b>Ignore cf of 0</b> at this stage	
	Communitive frequency 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	G1 for linear scales (linear from 70 to 190) ignore x < 70 vertical: 0 to 50 but not beyond 100 (no inequality scales)	
		G1 for labels	
	0 50 100 150 200 Hours	G1 for points plotted as (UCB, their cf). <u>Ignore</u> (70,0) at this stage. <b>No</b> mid – point or LCB plots.	5
(vi)	NB all G marks dep on attempt at cumulative frequencies.	G1 for joining all of 'their points'(line or	
	NB All G marks dep on attempt at cumulative frequencies	smooth curve) AND now including (70,0)	2
	Line on graph at cf = 43.2(soi) or used 90th percentile = 166	M1 for use of 43.2 A1FT but dep on 3rd G mark earned	
		TOTAL	18
L	I		

	$M.s.d = \frac{75.84}{25} = 3.034$	A1 FT their 4.92	3
	_		
	$S_{xx} = 681 - \frac{123^2}{25} = 75.84$	M1 for S <sub>xx</sub> attempted	
(iii)	$\Sigma fx = 123$ so mean = 123/25 = 4.92 o.e.	B1	
(ii)	Negative (skewness)	B1	1
(i)	8 7 6 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	G1 Labelled linear scales G1 Height of lines	2

3 (i)	Length of journey		
	120 80 60 40 20 0 2 4 6 8 10 Length of journey	G1 G1 G1	For calculating 38,68,89,103,112,120 Plotting end points Heights inc (0,0)
(ii)	Median = 1.7 miles	B1	
	Lower quartile = 0.8 miles	M1	
	Upper quartile = 3 miles	M1	
	Interquartile range = 2.2 miles	A1 ft	
(iii)	The graph exhibits positive skewness	E1	