Question Number	Scheme	Marks
4.(a)	Width: 15 minutes is 0.5 cm so 60 mins will be 4×0.5 = **2** (cm)	B1
	Height: freq of 25 represented by $6\times0.5=3$ (cm^2) so freq of 24 is $\frac{24}{25}\times3$	M1
	So height = $\frac{1}{"2"}\times\frac{24}{25}\times3$ = **1.44** (cm)	A1
		(3)
(b)	$[Q_2 =]$ $\{30\}+\frac{(50-[25+17])}{28}\times30$ or e.g. $\frac{60-30}{70-42}=\frac{m-\{30\}}{50-42}$	M1
	= 38.571… awrt **38.6**	A1
		(2)
(c)	Use of midpoints to get $\sum fx$ = 5070 (allow 5000 to 1 sf)	M1
	$[\bar{t}$ or $\bar{x}]$ = **50.7**	A1
		(2)
(d)	$[\sigma]=\sqrt{\frac{455\,512.5}{100}-"50.7"^2}$ or $\sqrt{1984.635}$	M1
	= 44.5492… awrt **44.5**	A1
		(2)
(e)	$\bar{t}$ or $\bar{x} > Q_2$ [allow "50.7" > "38.6" or formula] so positive (skew)	B1
		(1)
(f)(i)	Median: **no change**	
	Since e.g. all 18 values or all changes are still below the median	B2/1/0
(ii)	Mean: will be **smaller**	
	Since e.g. changes will reduce total of x (7×7.5 not 25×7.5 in 1st class)	B1
(iii)	Standard deviation: will be **greater**	
	Since e.g. (18 zeros means) data more spread out	(3)
		[13 marks]

	Notes
(a)	B1 for a width of 2 (cm) M1 for some calc' linking area and frequency for both groups or their w × their h = 2.88 A1 for 1.44 (or exact equivalent e.g. $\frac{36}{25}$)
(b)	M1 for $+\frac{8}{28}\times30$ (o.e.) May work down e.g. $\{60\}-\frac{20}{28}\times30$ or if using (n + 1) for $\frac{8.5}{28}\times30$ A1 for awrt 38.6 (accept $\frac{270}{7}$) or (if using (n + 1) for 39.107.. or awrt 39.1)
(c)	M1 for $\sum fx$ = 5000 (to 1 sf) or a fully correct expression using midpoints A1 for 50.7 or exact equivalent e.g. $\frac{5070}{100}$
(d)	M1 for a correct expression including square root (ft their mean) A1 for awrt 44.5 (or 44.55) (allow use of s = 44.77367… or awrt 44.8)
(e)	B1 for positive skew plus a suitable correct reason [allow use of values provided (c) > (b)] Allow correct use of quartiles but must see Q_1 = 15 and Q_3 = 72.5
(f)(i)~(iii)	B2 for all 3 correct statements B1 for only 2 correct statements (B1B0) 3rd B1 dep on B2 for at least one suitable reason. (Allow calculation of $\bar{x}$ or σ or s) Do not accept comments like "median not affected by extreme values"
NB	With 18 zeros Σfx = 4935, $\bar{x}$ =49.35, Σfx^2 = 454 500, σ = 45.930…, s = 46.161…