Question Number	Scheme	Marks
5(a)	$0.9 < x \leq 1.1$ group - width **0.5** (cm)	B1
	e.g. 1.5 (cm^2) is 2 seeds <u>or</u> 6.75 (cm^2 is 9 seeds) <u>or</u> $0.5c = 6.75$ oe <u>or</u> 45 <u>or</u> $\frac{10}{3}$	M1
	$0.9 < x \leq 1.1$ group - height **13.5** (cm)	A1 (3)
(b)	The data are continuous oe	B1 (1)
(c)	Mean $= \frac{67.8}{48} = 1.4125$ awrt 1.41 condone $\frac{113}{80}$	B1
	$\sigma = \sqrt{\frac{101.56}{48} - \left("\frac{67.8}{48}"\right)^2} = 0.347...$ awrt 0.347 (s = awrt 0.351)	M1dM1A1 (4)
(d)	Median $=[1.3]+ \frac{3}{11}\times 0.2$ allow $(n+1) = [1.3] + \frac{3.5}{11}\times 0.2$	M1
	= awrt **1.35** (or if using $(n + 1)$ allow awrt 1.36)	A1 (2)
(e)	$\frac{27}{48} = \frac{9}{16}$ or 0.5625 or 0.563	B1 (1)
(f)	Mean increases **AND** standard deviation decreases e.g. the 0.95 increases to 1.4 and is now closer the mean	B1 dB1 (2)

	Notes	Total: 13
(a)	B1 correct width. May see width = 1.5 copied from the question so look for subsequent work which appears to be their width if not clearly labelled	
	M1 for attempting to find the scale factor. A correct equation in any form scores this mark e.g. $\frac{1.5}{2} = \frac{0.5h}{9}$. Also score for sight of 6.75 ignore any labelling May use the formula height of class $= k \times \frac{\text{frequency}}{\text{class width}} \Rightarrow 1 = k\left(\frac{2}{2.7-2.1}\right)$ Score for sight of $\frac{10}{3}$ or 45 which may also be seen in $\frac{\frac{10}{3}}{1} = \frac{45}{h}$ May be implied by a correct height.	
	A1 correct height	
(b)	B1 for a valid reason that the data are continuous oe e.g. allow not discrete Do not allow continuous <u>uniform</u> distribution	
(c)	B1 awrt 1.41 – cannot be scored if only seen within the calculation for the variance. Condone as a fraction but not $\frac{67.8}{48}$	

	M1	attempt at $\frac{101.56}{48} - \mu^2$ no need for square root (allow s). May attempt $\sum fy^2$ using the table – look for an attempt with at least 3 correct products. May be implied by awrt 0.12 or $\frac{2317}{19200}$ or if s then $\frac{2317}{18800}$. May be implied by awrt 0.35
	dM1	dep on previous method mark for using $\sqrt{\frac{101.56}{48} - \mu^2}$ allow s May be implied by awrt 0.35
	A1	awrt 0.347 (or if using sample sd then awrt 0.351)
(d)	M1	for a correct fraction: $[1.3] + \frac{3}{11} \times 0.2$ or $m = 1.5 - \frac{8}{11} \times 0.2$ or alternatively allow the equation: $\frac{24-21}{m-1.3} = \frac{11}{0.2}$ oe May be implied by $\frac{149}{110}$ May be implied by awrt 1.35 or if using n+1 then awrt 1.36
	A1	awrt 1.35 (note 1.3545 may be rounded to 1.355 which is fine) If using (n+1) then allow awrt 1.36) Do not accept a fraction
(e)	B1	awrt 0.563
(f)	B1	for suggesting the mean increases and sd decreases
	dB1	dependent on the previous B mark. Gives **complete** reasoning why the mean increases and sd decreases. May refer to $\sum fy$ increasing which increases the mean instead of specifically referencing 0.95 condone use of e.g. close for closer ignore any non-contradictory statements