Question	Scheme	Marks
3(a)	Width = 1.25 [cm]	B1
	18.75 cm^2 for freq of 20 so $\frac{18.75}{20}\times 16 = 15$ cm^2 for a frequency of 16 or $w \times h = 15$ or fd = 5	M1
	[$h = 15 \div 1.25$ or $h = 8 \div 5 \times 7.5$ =] 12 (cm)	A1
		(3)
(b)	$Q_2 = [32+]\frac{7}{20}\times 4$ or using $n+1$ gives $Q_2 = [32+]\frac{7.5}{20}\times 4$	M1
	=33.4 ($n+1$ gives 33.5)	A1
		(2)
(c)	$\bar{y} = \frac{104}{50}[= 2.08]$ | $\sum(w-20) = 10\times 104[=1040]$ or $\sum w = 10\times 104 + 50\times 20[=2040]$	M1
	$\bar{w} = 10\times\text{"2.08"} + 20 = 40.8$* | $\frac{\text{"1040"}}{50} + 20 = 40.8$ or $\frac{\text{"2040"}}{50} = 40.8$	A1*
		(2)
(d)	[Variance of y =] $\frac{233.54}{50} - (\text{"2.08"})^2 \left[= \frac{861}{2500} = 0.3444\right]$ or 10 × sd of y = sd of w or $100\times 233.54 = \sum(w^2) - 40\times\text{"2040"} + 50\times 400 \left[\Rightarrow \sum(w^2) = 84954\right]$ oe	M1
	[Variance of w =]"0.3444"×100 or $\frac{\text{"84954"}}{50} - 40.8^2 \left[= \frac{861}{25} = 34.44\right]$ or sd of $y = \sqrt{\text{"0.3444"}} \left[= \frac{\sqrt{861}}{50} = 0.5868...\right]$	M1
	sd of $w = \sqrt{\text{"0.3444"}\times 100}$ or $\sqrt{\text{"34.44"}}$ or $10\times\text{"}\frac{\sqrt{861}}{50}\text{"}$	M1
	= 5.868… awrt 5.87	A1
(e)(i)	The mean would not change (as 40.8 is the mean)	B1
(ii)	The standard deviation would decrease (as 40.8 is in the middle so data closer together)	B1
	Both correct with a correct reason for why the standard deviation decreases	ddB1
		(3)
	Notes	**Total 14**

Question Number	Scheme	Marks
3. (a)	0.02 and $0.98 - p$ correctly placed [no mixing of % and probability]	B1
	0.96 and 0.05 plus $1 - q$, 0.04, 0.95 correctly placed	B1
		(2)
(b)	$P(T) = pq + 0.02\times 0.96 + (0.98 - p)\times 0.05 = 0.169$	M1; A1
	$\{pq - 0.05p = 0.1008\}$	
	P(do not have disease | T) = $\frac{\text{"}(0.98-p)\text{"}\times 0.05}{0.169} = \frac{41}{169}$	M1A1ft
	So $p =$ **<u>0.16</u>**	A1
	e.g. $0.16q - 0.16\times 0.05 = 0.1008$	dM1
	$q =$ **<u>0.68</u>**	A1
		(7)
(c)(i)	P(type A | T and not type B) = $\frac{pq}{pq + (0.98-p)\times 0.05} = \frac{0.1088}{0.1088 + 0.041}$	M1A1ft
	= 0.7263… awrt **<u>0.726</u>**	A1
		(3)
(ii)	Should find test useful, doctor knows there is a much greater chance that the person has type A (0.73 compared to 0.16 or 0.163…[from $\frac{0.16}{0.98}$])	B1
		(1)
		[13]