Question Number	Scheme	Marks
3. (a)	$\left[\bar{x} =\right]\dfrac{-1.2}{8}\,[=-0.15]$ $\sum b = 21\times 8 + 2\times(-1.2)\,[=165.6]$ $"-0.15" = \dfrac{\bar{b}-21}{2}$ oe $\left[\bar{b} =\right]\dfrac{165.6}{8}$ = **<u>20.7</u>** (cm)	M1 M1 A1 (3)
(b)	$\sigma_x = \sqrt{\dfrac{5.1}{8} - \left(\dfrac{-1.2}{8}\right)^2}\,[=\sqrt{0.615} = 0.784...]$ $\sigma_b = 2\times '0.784...'$ = awrt **<u>1.57</u>** (cm)	M1 M1 A1 (3)
(c)(i)	$x_9 = 1.2 \rightarrow b_9 = 1.2\times 2 + 21$ oe **or** $9\times 21 - 8\times '20.7'\,[=354.6]$ = **<u>23.4</u>** (cm)	M1 A1 (2)
(ii)	$\sum x^2 = 5.1 + 1.2^2\,[=6.54]$ $\left[\Rightarrow \sigma_x = \sqrt{\dfrac{5.1+1.2^2}{9} - 0^2}\right]$ = awrt **<u>0.852</u>** (cm)	M1 A1 (2)
	Notes	**Total 10**

(a) 1st M1 for correct expression for $\bar{x}$ ignore letter

2nd M1 Using equation. $"\bar{x}" = \dfrac{\bar{b}-21}{2}$ where $-1.2 < '\bar{x}' < 1.2$ Condone b rather than $\bar{b}$

A1 20.7 oe

1st M1 for correct expression for $\sum b$

2nd M1 use of $"\sum b" \div n$ where $'\sum b' > 18$

(b) 1st M1 correct method for σ_x **or** σ_x^2 **or** $5.1 = \dfrac{\sum b^2 - 42\times "168.6" + 8\times 441}{4}$ **or** $\sum b^2 = 3447.6$

2nd M1 for use of 2 × their σ_x (or 4 × their σ_x^2) (adding 21 is M0) **or**

$\dfrac{"3447.6"}{8} - \left(\dfrac{"165.6"}{8}\right)^2$ or $\sqrt{\dfrac{"3447.6"}{8} - \left(\dfrac{"165.6"}{8}\right)^2}$

A1 awrt 1.57 Allow $\dfrac{\sqrt{246}}{10}$ (allow s_b = awrt 1.68 or $\dfrac{4\sqrt{246}}{35}$ from an $n-1$ method)

(c)(i) M1 for a correct equation using $x_9 = 1.2$ to enable b_9 to be found eg $1.2 = \dfrac{b-21}{2}$

or a correct method to find $\sum x$ for the 9 squirrels. ft their 20.7

A1 23.4 oe

(ii) M1 for $5.1 + "(\pm 1.2)"^2\,[=6.54]$ seen ft their x_9 Condone $5.1 + (\pm 9.6)^2\,[=97.26]$

A1 awrt 0.852 Allow $\dfrac{\sqrt{654}}{30}$ (allow s_x = awrt 0.904 from an $n-1$ method)