| Question Number | Scheme | | Marks |
|---|---|---|---|
| 7(a) | $[\mu \text{ or } \bar{x} =]\frac{8360}{10} = 836$ | | B1 |
| | $(\sigma =)\sqrt{\frac{\sum(x-\bar{x})^2}{10}} = \sqrt{\frac{63840}{10}}$ | $(s =)\sqrt{\frac{\sum(x-\bar{x})^2}{9}} = \sqrt{\frac{63840}{9}}$ | M1 |
| | = 79.89993... awrt 79.9 | = 84.22192... awrt 84.2 | A1 |
| | | | (3) |
| (b) | Mean > Median | | B1 |
| | So positive skew | | dB1 |
| | | | (2) |
| (c) | $\frac{776+896}{2} = 836$ which is the same as $\bar{x}$ **or** one is 60 above $\bar{x}$, one 60 below | | B1 |
| | So no change in the mean | | dB1 |
| | | | (2) |
| (d) | $896-836 = 836-776 = 60 < 79.9/84.2$ or<br>$(896-836)^2 = (776-836)^2 = 60^2 = 3600 < 6384$ or<br>$\left[\frac{\sum(x-\bar{x})^2}{12} \rightarrow\right] \frac{63840+2\times60^2}{12} = \frac{71040}{12} = 5920 < \frac{63840}{10}$ or<br>$\sqrt{5920} = 76.9 < 79.9/84.2$ | | B1 |
| | So standard deviation will reduce | | dB1 |
| | | | (2) |
| | **Notes** | | **Total 9** |
| (a) | **B1** | Cao Allow a correct fraction | |
| | **M1** | for a correct expression for $\sigma$ or $\sigma^2$ or s or $s^2$ (ignore labels).<br>NB $\sum x^2 = 7052800$ but must see at least $\sigma^2 = \frac{7052800}{10} - (\text{"836"})^2$ for M1 | |
| | **A1** | Awrt 79.9 or awrt 84.2 if s is calculated cao scores M1A1 Do not allow $4\sqrt{399}$ | |
| (b) | **B1** | For a correct comparison of mean and median (allow 836 > 815 or 815 < 836)<br>May see $\frac{k(\text{mean}-\text{median})}{\sigma \text{ or } \sigma^2}$ (o.e.) if so just check sign of answer (provided denom > 0) | |
| | **dB1** | Dependent on 1st B1 for positive skew. Positive correlation is B0<br>**SC** If their mean is < 815 award B0B1 for the comparison **and** statement of negative skew | |
| (c) | **B1** | For a suitable calculation to show mean of these two rabbits (or all 12) is the same<br>e.g. new $\sum x = 8360+776+896 = 10032$, so mean = $\frac{10032}{12} = 836$<br>**NB We must see a calculation** | |

| | | |
|---|---|---|
| | **dB1** | Dependent on a suitable calculation or reason for stating no change oe |
| (d) | **B1** | For a suitable calculation showing 60 and comparing with 79.9/84.2 or a suitable calculation showing 3600 and comparing with 6384 or calculation of new variance 5920 and comparing with 6384 or calculation of new standard deviation 76.9 and comparing with 79.9/84.2 |
| | **dB1** | Dependent on 1st B1 for stating standard deviation reduces oe |