

6. a) There are 50 scores, so the median lies between the 25th and 26th scores.
i.e. between 73 and 75. **Median = 74**
- b) $(UQ - LQ) \div 2$ LQ is 13th item
UQ is 38th item
So **S.I.R.** = $(83 - 69) \div 2 = 14 \div 2 = 7$
- c) Lo = 63, Hi = 98, Q₁=69, Q₂=74, Q₃=83
7. Put into order
6, 7, 9, 9, 12, 13, **16**, 18, 18, 20, 22, 24, 28
 ↑ ↑ ↑
 LQ Median UQ
- 13 items: **Median** is 7th item = **16**
 LQ= 9 UQ = 21
 Transfer onto sketch.
- 6 9 16 21 28

Standard Deviation

1. Use formula $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
 Use 3 columns: x, $(x-\bar{x})$ $(x-\bar{x})^2$
 $\sum x = 276$, mean = $276 \div 6 = 46$
 $\sum(x-\bar{x})^2 = 84$, SD = $\sqrt{\frac{84}{5}} = 4.098...$
 Mean = 46p Standard Deviation = 4.1p
- Sugar prices more consistent compared to milk
 or milk prices more variable than sugar prices.
2. Use formula $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
 Use 3 columns: x, $(x-\bar{x})$ $(x-\bar{x})^2$
 $\sum x = 102$, mean = $102 \div 8 = 12.75$
 $\sum(x-\bar{x})^2 = 111.5$, SD = $\sqrt{\frac{111.5}{7}} = 3.991...$

A better formula to use is $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$
 to avoid a lot of decimal calculations

$\sum x = 102$, $\sum x^2 = 1412$, $(\sum x)^2 = 10404$
 This also gives SD = 3.991..

Mean = 12.75 hrs Standard Deviation = 3.99 hours

Alloa High School were more variable in the
 hours they spent in study time than Alloa Academy.

3. Use formula $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
 Use 3 columns: x, $(x-\bar{x})$ $(x-\bar{x})^2$
 $\sum x = 750$, mean = $750 \div 5 = \text{£}150$
 $\sum(x-\bar{x})^2 = 15200$, SD = $\sqrt{\frac{15200}{4}} = \text{£}61.64$
 Mean = £150 Standard Deviation = £61.64

4. A better formula to use is $s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$
 to avoid a lot of decimal calculations
- Mean = 84.33 pence Standard Deviation = 1.28 pence

The rural garages had a higher average price and the
 prices were more variable.

5. Use formula $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
 Use 3 columns: x, $(x-\bar{x})$ $(x-\bar{x})^2$
 $\sum x = 36$, mean = $36 \div 6 = 6$
 $\sum(x-\bar{x})^2 = 84$, SD = $\sqrt{\frac{80}{5}} = 4$
 Mean = 6 Standard Deviation = 4
6. Use formula $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$
 Use 3 columns: x, $(x-\bar{x})$ $(x-\bar{x})^2$
 $\sum x = 78$, mean = $78 \div 6 = 13$
 $\sum(x-\bar{x})^2 = 76$, SD = $\sqrt{\frac{76}{5}} = 3.898...$
 Mean = 13 Standard Deviation = 3.9