1F – Measures of Centre and Spread

**MEDIAN (MEASURE OF CENTRE)** **&** **MODE (MOST FREQUENTLY OCCURRING)**

* Make sure the data set is ordered from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_
* For n data values, the **median** is at position
* When n is odd, the **median** is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* When n is even, the **median** is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the two middle values
* The **mode** is the most frequently occurring data value (can be more than one)

*Find the median and mode of the following data sets by first ordering them from smallest to largest, then finding the position of the median:*

1. 2 9 1 8 3 5 3 8 1 b) 10 1 3 4 8 6 10 1 2 9

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

n = \_\_\_\_ = \_\_\_\_\_ n = \_\_\_\_ = \_\_\_\_\_

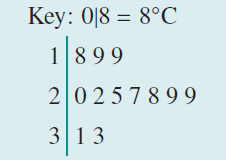
median = \_\_\_\_\_\_\_ median = \_\_\_\_\_\_\_

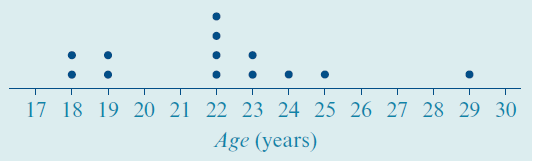
mode = \_\_\_\_\_\_\_\_\_\_ mode = \_\_\_\_\_\_\_\_\_\_

*Now check your answers using both your calculator and Mathematica*

**FINDING THE MEDIAN OR MODE FROM DOT PLOTS AND STEM PLOTS**

*Find the median or mode from the following data sets:*





n = \_\_\_\_ = \_\_\_\_\_ n = \_\_\_\_ = \_\_\_\_\_

median = \_\_\_\_\_\_\_ median = \_\_\_\_\_\_\_

mode = \_\_\_\_\_\_\_\_\_\_ mode = \_\_\_\_\_\_\_\_\_\_

*Now check your answers using both your calculator and Mathematica*

1F – Measures of Centre and Spread

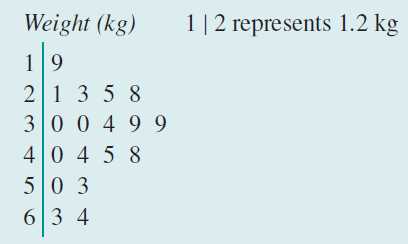
**RANGE (MEASURE OF SPREAD)** **&** **INTERQUARTILE RANGE (MEASURE OF SPREAD)**

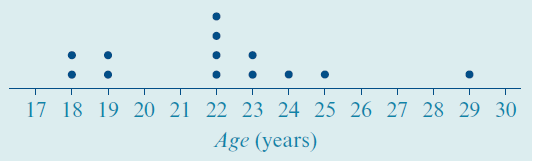
* Make sure the data set is ordered from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_
* The range is the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ value minus the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ value
* Divide the data into two equal halves. If n is \_\_\_\_\_ do not include the median.
* Locate Q1 (the first quartile) which is the median of the \_\_\_\_\_\_\_\_\_\_\_ half
* Locate Q3 (the third quartile) which is the median of the \_\_\_\_\_\_\_\_\_\_ half

,

* IQR = \_\_\_\_\_ – \_\_\_\_\_

*Find the range and interquartile range for the following data sets:*





n = \_\_\_\_ = \_\_\_\_\_ n = \_\_\_\_ = \_\_\_\_\_

median = \_\_\_\_\_\_\_ median = \_\_\_\_\_\_\_

Q1 = \_\_\_\_ Q3 = \_\_\_\_ Q1 = \_\_\_\_ Q3 = \_\_\_\_

IQR = \_\_\_\_\_ IQR = \_\_\_\_\_

*Now check your answers using both your calculator and Mathematica*

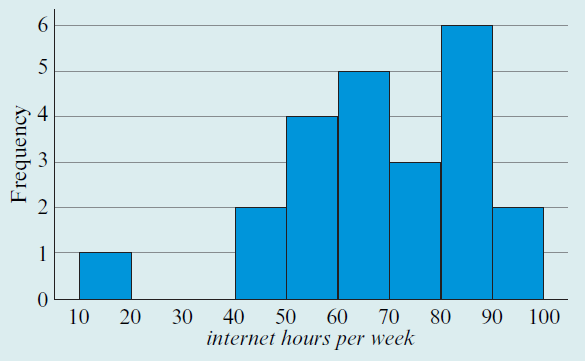
**WHY IS THE IQR OFTEN A BETTER MEASURE OF SPREAD THAN THE RANGE?**

* The IQR measures the spread of the middle \_\_\_\_\_% of the data
* The upper \_\_\_\_\_% and lower \_\_\_\_\_% are not included
* Hence, the IQR is not affected by possible \_\_\_\_\_\_\_\_\_\_\_\_\_ in the data set

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**FINDING INTERVALS FOR THE MEDIAN AND QUARTILES FROM A HISTOGRAM**

*Find possible values for the median and quartiles for the following distribution:*



n = \_\_\_\_\_\_

= \_\_\_\_\_

median interval: \_\_\_\_\_\_\_\_\_\_

Q1 interval: \_\_\_\_\_\_\_\_\_\_

Q3 interval: \_\_\_\_\_\_\_\_\_\_

*Now check your answers using both your calculator and Mathematica*

**MEAN (MEASURE OF CENTRE)**

The mean of a set of data is often called the \_\_\_\_\_\_\_\_\_\_\_\_

mean = OR using symbols:

*Find the mean for the following set of data by hand:*

38 36 35 43 46 64 48 25

*Now check your answer using both your calculator and Mathematica*

**WHEN IS THE MEDIAN A BETTER MEASURE OF CENTRE THAN THE MEAN?**

* If the data is symmetric with no outliers, either measure is effective
* If the data is skewed or has outliers, the median is a more effective measure

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**STANDARD DEVIATION (MEASURE OF SPREAD)**

The formula to work out standard deviation is:

1. Calculate the mean
2. Work out the difference between each value and the mean
3. Square these differences (so that they are all positive values)
4. Add up the squared differences
5. Divide this total by one less than the number of data values
6. Take the square-root

Find the standard deviation for the following data:

*The heights (in cm) of a group of women are recorded below:*

176 160 163 157 168 172 173 169

|  |  |  |
| --- | --- | --- |
| Height | (x – ) | (x – )2 |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
| Sum of squared differences: | |  |
| Divided by (n – 1): | |  |
| Square-root to give SD: | |  |

*Now check your answer using both your calculator and Mathematica*