AVERAGES   Intermediate Revision Sheet
RANGE,   MEAN,   MEDIAN,   MODE

> Hey diddle diddle
> The **medians** in the **middle**
> You **add** and **divide** the **mean**
> The **mode** is the one you see the **most**
> And the **range** is the **difference between**

MEAN (1)   Set of Discrete data

$$\text{Mean} = \frac{\text{Sum of all the data values}}{\text{Numer of data values}} \qquad \frac{3 + 2 + 6 + 2 + 2 + 3 + 7}{7} \qquad \frac{25}{7} \qquad = 3.61 \text{ to 2.d.p}$$

MODE
The **mode** is the value that appears most with in a set of data Example, the mode of the values
4, 5, 4, 2, 9 is 4. It's possible to have more than one mode or no mode with a group of data.

MEDIAN
The **median** is the middle value in a set of data that has been written in order smallest to biggest
For example to find the median of the set of data 3, 2, 6, 2, 2, 3, 7 We need to rewrite in order
That is   2, 2, 2, 3, 3, 6, 7. The median is the 4th number which is 3
If the number in a data set is even then the **median** is the mean value of the two middle numbers.

RANGE
In a set of data, the **range** is the difference between the biggest and smallest value.
For example the **range** of these values is 4, 5, 4, 2, 9 is $9 - 2 = 7$

GROUPED DATA

MEAN 2   Frequency Table
Find the Total of all values ÷ Total Frequency

Age of pupils	Frequency
5	1
6	4
7	3
8	6

$$\textbf{Mean} = \frac{5 \times 1 + 6 \times 4 + 7 \times 3 + 8 \times 6}{1+4+3+6} \;=\; \frac{98}{14}$$

← #TopTip
Must show this

Mean Age = 7

MEAN 3   Grouped Frequency Table

Age	Frequency	Midpoint	
10 < a ≤ 20	5	15	5 x 15 = 75
20 < a ≤ 30	8	25	8 x 25 = 200
30 < a ≤ 40	4	35	3 x 35 = 140
	17		415

#TopTip
Add two extra columns
Multiply mid-point by frequency

$$\text{Mean} = \frac{415}{17} = 24.4 \qquad \text{Mean Age} = 24$$

If the data is grouped we can find the **modal group**.
In above example Modal group is 20 < a ≤ 30

If the data is group we can find the **class interval that contains the median value**.
In the table of marks above the median is the 9th number which is the class **interval 20 < a ≤ 30**

BOX and WHISKER Plots

A **box and whisker plot** is used to display information about the range, the median and the quartiles. It is usually drawn alongside a number line, as shown:
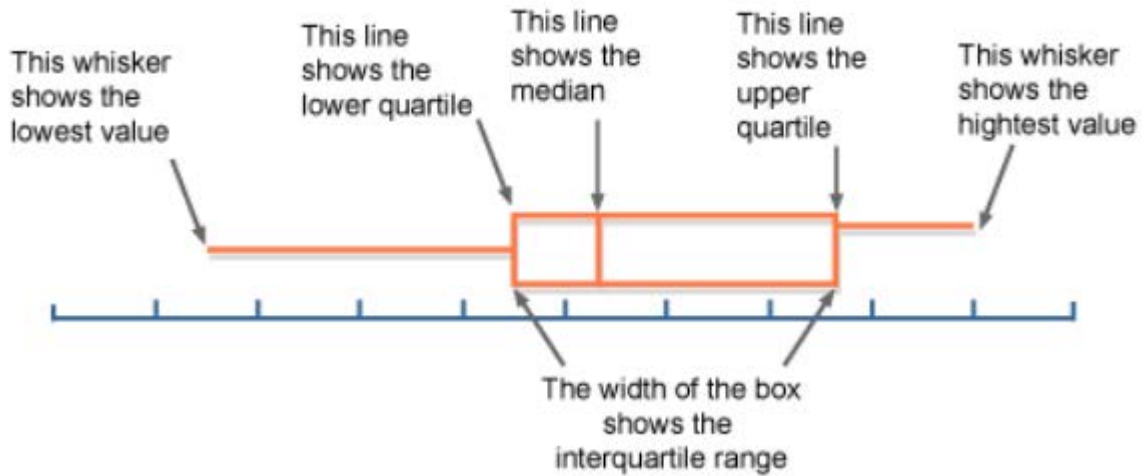
Example

The oldest person in Holyhead is 90. The youngest person is 15.

The median age of the residents is 44, the lower quartile is 25, and the upper quartile is 67.

Represent this information with a box-and-whisker plot.