

## Chapter 1 - Measure of Central Tendencies

The mean is the sum of all values divided by the number of values  
 The median is the middle value when values are arranged in order  
 The mode is the most commonly occurring value

Take the numbers 7, 6, 5, 6, 8, 5, 7, 8, 9

Mean =  $68/10 = 6.8$

↳ The sum of all the values is 68 and the total values are 10

Median =

↳ Order the sequence: 5, 5, 6, 6, 7, 7, 8, 8, 9

↳ Isolate the middle value: 5.5 — so the 5 and 6 values — hence the answer is  $7+7/2 = 7$

Mode = 7 as it occurs most frequently

A frequency table is another way of storing data

Frequency is the number of times a value occurs

Number of Flowers	Frequency (f)
0	12
1	21
2	8
3	3
4	0
5	1

From the frequency table we can see that 12 times there were 0 flowers (12 is the frequency), and 21 times there was 1 flower (21 is the frequency)

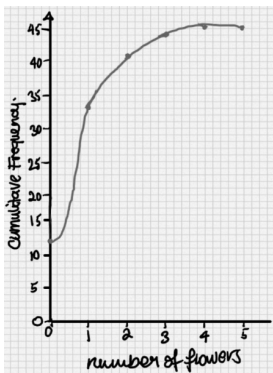
To find the mean of a frequency table you multiply the value by frequency and add up the products of the frequency and number:

$$\begin{aligned} 0 \times 12 &= 0 \\ 1 \times 21 &= 21 \\ 2 \times 8 &= 16 \\ 3 \times 3 &= 9 \\ 4 \times 0 &= 0 \\ 5 \times 1 &= 5 \end{aligned}$$

Add up all of the values and you get 51

Divide 51 by the total frequency:  $51 / 45 = 1.1$  mean value

The cumulative frequency is calculated by adding each frequency from a frequency distribution table to the sum of its predecessors:



$$\begin{aligned} 12 + 21 &= 33 & 1 &= 45 \\ \underline{33} + 8 &= 41 \\ \underline{41} + 3 &= 44 \\ \underline{44} + 0 &= 44 \end{aligned}$$

This data is usually represented by a frequency table (as shown above) or a frequency curve.

### Quartile and interquartile range

It is the range of values between 25% and 75%

To find the quartile range, find 25% and 75% of the frequency. Draw the line from the frequencies to their corresponding values on the x-axis and subtract them:

$$\begin{aligned} \text{Lower quartile} &= 25/100 \times 45 = 11.25 \\ \text{Upper quartile} &= 75/100 \times 45 = 33.75 \\ \text{Hence interquartile range} &\text{ will be } 1.1 - 0.3 = 0.8 \end{aligned}$$

### Variance and Standard Deviation

Variance and standard deviation are two other types of central tendencies.

Variance is the standard deviation SQUARED

They can be found using the following formula:

$$s^2 = \frac{\sum(x_i - \bar{x})^2}{n - 1}$$