MEAN, MODE & MEDIAN

The mean, mode and median are measures of the centre or middle of a set of data. They are sometimes called measures of central tendency and they provide a single value that is typical of the data.

The **mode** is the value that occurs most often.

The **median** is the middle value when the data is arranged in order.
The **mean** (or average) is the sum of all the scores divided by the number of scores in the data set:

$$\bar{x} = \frac{\sum x_i}{n}$$

Examples

1. Consider the data set 3, 2, 0, 5, 2
   The mode is 2 because it has the highest frequency.

   Rearranging the data in order gives 0, 2, 2, 3, 5: the median is 2.

   middle score

   The mean is $\bar{x} = \frac{\sum x_i}{n} = \frac{3+2+0+5+2}{5} = 2.4$

2. Find the mean mode and median of the data displayed in the frequency table

x	frequency
-3	1
-1	3
4	1
5	2
24	1
	n = ∑f = 8

highest frequency

n = number of scores is the sum of all the frequencies

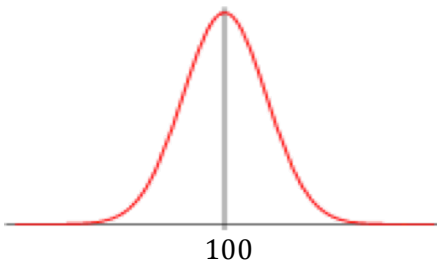
The mode is -1 [this score occurs most often]

There are 8 scores and so ***two*** 'middle' scores, the 4th and 5th. The median is the average of these two scores: median $= \frac{-1+4}{2} = 1.5$

The mean is $\frac{(-3)\times1+(-1)\times3+4\times1+5\times2+24\times1}{8} = 4$

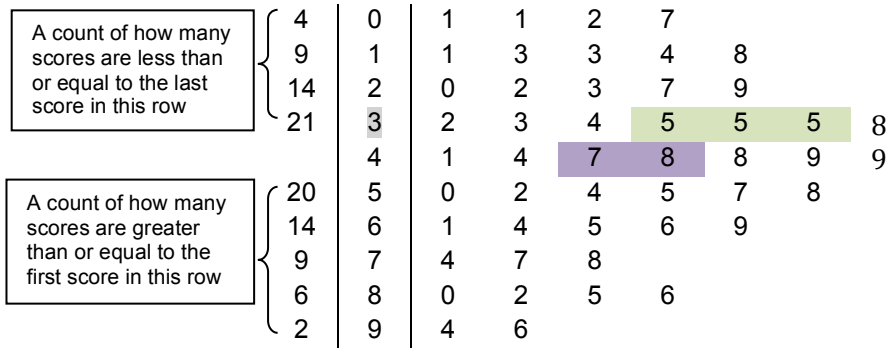
[NB: A disadvantage of the mean is that it is affected or distorted by extreme or outlying values.]

Graphs and the mode, median and mean



For symmetrical bell shaped graphs such as this the mode, median and mean all have the same value, 100

The data set *1, 1, 2 ….86, 94, 96* is shown in the stem and leaf plot below



A scan of the data organised into the plot reveals that the mode is 35.
There are 21 scores less than or equal to 38 and 20 scores greater than or equal to 50 . There are also 7 scores in the forties. So altogether there are 48 scores. The median will be midway between the 24th and 25th scores which are easy to locate when we know the 21st score is 38.
The median is 47.5.

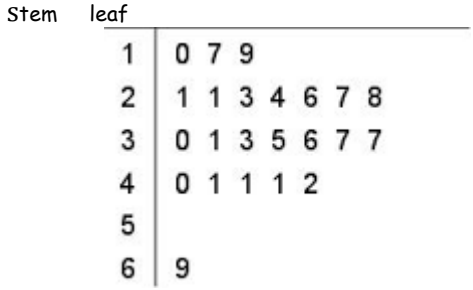
Exercises

1. Given the following scores: 12, 12, 13, 14, 14, 15, 15, 15, 16.
   (a) Find the mean score
   (b) Find the median
   (c) What is the mode?

2. Determine the mean, mode and median for the data in the frequency table

Score	Frequency
40	1
50	4
60	8
70	3
80	3
90	1
Total	20

3. Find the mode and median for the data displayed in the stem and leaf plot for which the smallest score is 10 and the largest 69.



Answers
1. (a) 14 (b) 14 (c) 15
2. mean 63, mode 60, median 60
3. mode 41, median 31