

# Analysing stem-and-leaf plots

Using measures of central tendency and the range, you can analyse the information presented in a stem-and-leaf plot.

Click [here](#) to review stem-and-leaf plots.

This [stem-and-leaf](#) plot will be used to demonstrate how to find the [range](#), [mode](#), [median](#) and [mean](#),  $\bar{x}$ .

Age in years of people attending a lecture

Stem	Leaf
1	6
2	0 4 5 5 6 7 7 9
3	2 3 5 5 5 5 7 8 9
4	1 3 4 5 6 7

## Calculate the range

Stem	Leaf
①	⑥ Lowest score
2	0 4 5 5 6 7 7 9
3	2 3 5 5 5 5 7 8 9
④	1 3 4 5 6 ⑦ Highest score

$$\begin{aligned}\text{Range} &= \text{highest score} - \text{lowest score} \\ &= 47 - 16 \\ &= 31\end{aligned}$$

The range of ages is 31 years.

## Find the mode

The mode is the score (age) that occurs most often.

Any scores (ages) that repeat will be next to one another in the plot.

Stem	Leaf
1	6
2	0 4 ⑤ ⑤ 6 ⑦ ⑦ 9
3	2 3 ⑤ ⑤ ⑤ ⑤ 7 8 9
4	1 3 4 5 6 7

There are two 25 year olds and two 27 year olds, but four 35 year olds.

The mode is 35. So the **modal age** (most common age) is 35.

## Find the median

The median is the middle score when they are arranged in order.

First count the number of scores: Number of scores = 24

Then halve the number of scores: Half of 24 = 12

The median score lies between the 12th and 13th score. Counting from the lowest score, you can see that the 12th and 13th scores are both 35.

The median age is 35.

## Calculate the mean

$$\text{Mean} = \frac{\text{sum of all scores}}{\text{number of scores}}$$

First calculate the sum of the scores (ages).

$$16 + 20 + 24 + 25 + 25 + 26 + 27 + \dots + 46 + 47 = 804$$

$$\begin{aligned}\text{Mean} &= \frac{804}{24} \\ &= 33.5\end{aligned}$$

So 33.5 is the average age.

You can also use the statistics mode on your calculator to enter each age one at a time. The calculator can then give you the mean.

Click [here](#) to review finding means.

## Analyse your findings

The mean (33.5) is lower than the median (35) and the mode (35). This indicates that the low scores were not balanced by the high scores.

The range of 31 is large compared to the size of the data so the ages were quite spread out.

## Outliers

Outliers (extremes) are scores that are much smaller or larger than the rest of the scores. These scores may be due to errors when collecting the data or are not typical for some other reason.

The outlier score **112** is much smaller than the nearest score in the [clustered](#) data.

Outliers can have a strong effect on the mean and the range but little effect on the median and mode.

Stem	Leaf
11	2
12	
13	1 2 6
14	3 4 7 7 9 9
15	0 4 9
16	1 1

After careful consideration, sometimes outliers are ignored to get a better idea of the 'centre' of the data.

Click [Widget](#) to create your own stem-and-leaf plots and to manipulate the data to effect changes on the measures of centre.

Print [Hotsheet](#) to practise analysing the data in stem-and-leaf plots and to see the effect of an outlier on the data values.

Click [Solutions](#) to check your answers when you have completed the Hotsheet.