

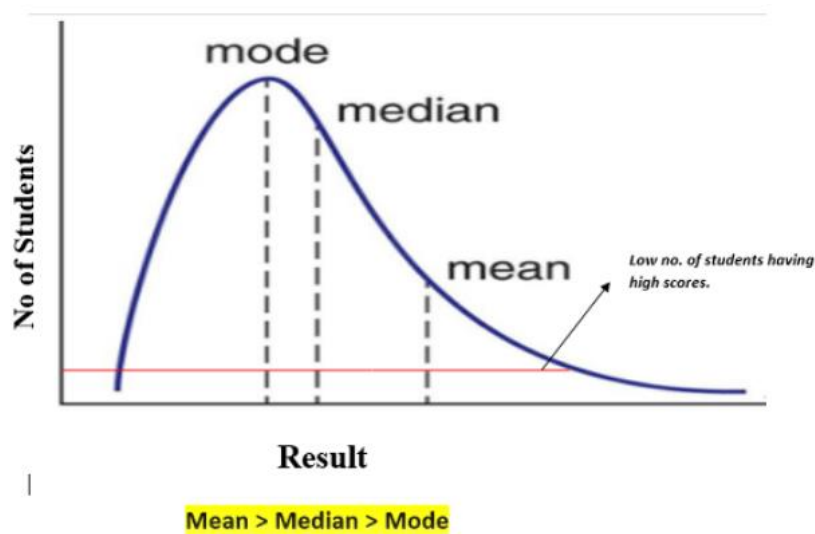
Skewness

Skewness defines the shape of the distribution. Usually, we get a lot of asymmetric distributions, and these distributions have unevenly spread data. There are three types of skewness – positive or right-skewed and negative or left-skewed and No Skewness or Normal

Positive Skewness

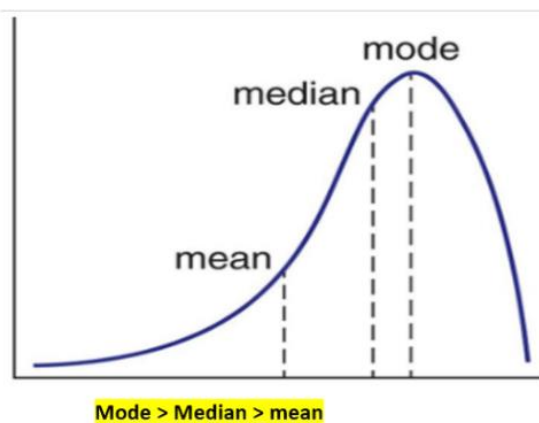
Positive skewness is when the distribution takes place so that we get a long tail towards the right side of the graph. This is called a right-skewed graph,

In this distribution, the mean is greater than the median, which is greater than the mode. That is, we get $\text{mean} > \text{median} > \text{mode}$.

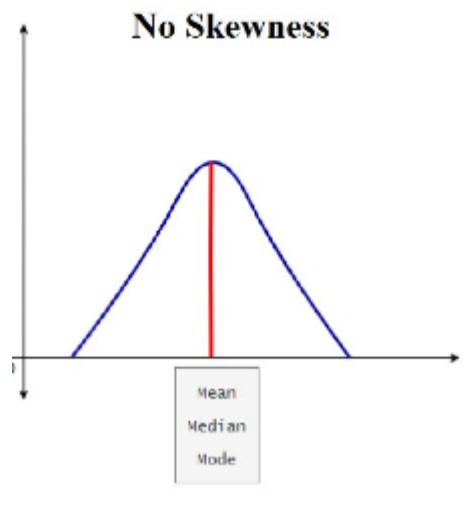


Negative Skewness

Negative skewness is when the distribution takes place so that we get a long tail towards the left side of the graph. This is called a left-skewed graph.



No Skewness or Normal



Mean = Mode = Median

A distribution has no skewness (i.e., it is symmetrical) if the left and right tails of the histogram are perfectly mirror images of each other relative to the centre (mean) of the distribution.

Rule of thumb:

- For skewness values between -0.5 and 0.5, the data exhibit approximate symmetry.
- Skewness values within the range of -1 and -0.5 (negative skewed) or 0.5 and 1 (positive skewed) indicate slightly skewed data distributions.
- Data with skewness values less than -1 (negative skewed) or greater than 1 (positive skewed) are considered highly skewed.

Interpreting Skewness Values:

- **Skew 0.0:** A perfectly symmetrical distribution.
- **Skew -0.132649:** Slightly negatively skewed (left-skewed), meaning the left tail is slightly longer or fatter than the right tail.
- **Skew 0.163639 to 0.313576:** Slight to moderate positive skewness (right skewed), meaning the right tail is slightly longer or fatter than the left tail.
- **Skew 3.569747:** Highly positively skewed, indicating a distribution with a long or fat tail on the right side.

Kurtosis

Kurtosis is a statistical measure that describes the shape, or peakedness, of a probability distribution. It indicates whether the data are heavy-tailed or light-tailed relative to a normal distribution. A normal distribution has a kurtosis of 3 (mesokurtic), and distributions with kurtosis greater than 3 are called leptokurtic (more peaked) while those with kurtosis less than 3 are called platykurtic (less peaked). Here's a simple explanation of the types of kurtoses with graphical examples:

1. Mesokurtic:

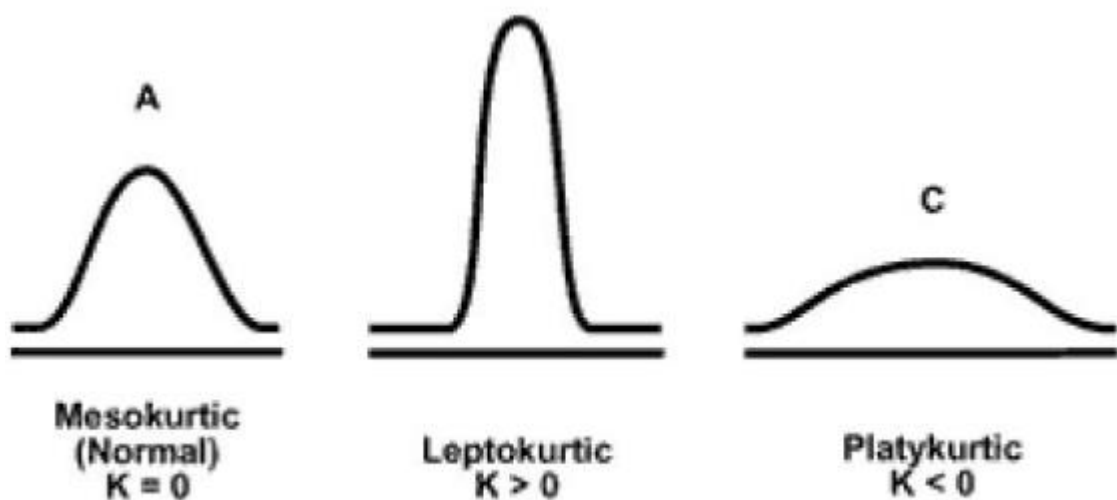
- A distribution with kurtosis equal to 3, similar in shape to the normal distribution.
- The peak is moderate, and the tails are neither too heavy nor too light.
- It is considered a baseline or standard for comparison.

2. Leptokurtic:

- A distribution with kurtosis greater than 3.
- It has a sharper peak and heavier tails compared to the normal distribution.
- This indicates that the distribution has more values near the mean and more frequent extreme deviations (outliers).

3. Platykurtic:

- A distribution with kurtosis less than 3.
- It has a flatter peak and lighter tails compared to the normal distribution.
- This indicates that the distribution has fewer values near the mean and less frequent extreme deviations.



Mesokurtic, leptokurtic and platykurtic.

In summary:

- **Mesokurtic** distributions (kurtosis = 3) have a moderate peak, similar to the normal distribution.
- **Leptokurtic** distributions (kurtosis > 3) have a sharper peak and heavier tails.
- **Platykurtic** distributions (kurtosis < 3) have a flatter peak and lighter tails.

Kurtosis is a useful measure because it provides insights into the shape and tail behaviour of a distribution, which can influence various statistical analyses and decision-making processes in fields such as finance, economics, and risk management.

Interpreting Kurtosis Values:

- **Kurtosis -1.2 to -0.60751:** Negative kurtosis, indicating a distribution with lighter tails and a flatter peak than a normal distribution (platykurtic).
- **Kurtosis 0.450765:** Positive kurtosis, indicating a distribution with heavier tails and a sharper peak than a normal distribution (leptokurtic).
- **Kurtosis 0.052143:** Close to zero, indicating a distribution like a normal distribution (mesokurtic).
- **Kurtosis -1.08858 to -0.470723:** Negative kurtosis, similar characteristics as before.
- **Kurtosis 18.544273:** Very high positive kurtosis, indicating a distribution with very heavy tails and a very sharp peak.