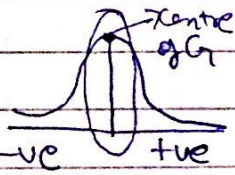
Skewness, Moments & Kurtosis

(1) Meaning of Skewness :- It refers to the magnitude or direction of any variation in distribution series. Dispersion facilitate to measure volume of variation however could not define the direction which is further measured with the help of skewness.

In the following cases any distribution is termed as skewed :-

(i) where the value of averages, i.e mean and median fall at different point with unequal balance (centre of gravity). In nurtial where mean median do not coincide.



~~(ii) when the value of averages, i.e mean and median fall at different~~

(ii) when a distribution is plotted over a graph and it does not result a bell shape figure, it is skewed.

(iii) where the proportion of left tail does not equal to the proportion of right tail is skewed.

wheat grass growth.

In probability theory and statistics, **skewness** is a measure of the asymmetry of the probability distribution of a real-valued random variable about its mean. The skewness value can be positive, zero, negative, or undefined.

For a unimodal distribution, negative skew commonly indicates that the *tail* is on the left side of the distribution, and positive skew indicates that the tail is on the right. In cases where one tail is long but the other tail is fat, skewness does not obey a simple rule. For example, a zero value means that the tails on both sides of the mean balance out overall; this is the case for a symmetric distribution, but can also be true for an asymmetric distribution where one tail is long and thin, and the other is short but fat.

Consider the two distributions in the figure just below. Within each graph, the values on the right side of the distribution taper differently from the values on the left side. These tapering sides are called *tails*, and they provide a visual means to determine which of the two kinds of skewness a distribution has:

1. *negative skew*: The left tail is longer; the mass of the distribution is concentrated on the right of the figure. The distribution is said to be *left-skewed*, *left-tailed*, or *skewed to the left*, despite the fact that the curve itself appears to be skewed or leaning to the right; *left* instead refers to the left tail being drawn out and, often, the mean being skewed to the left of a typical center of the data. A left-skewed distribution usually appears as a *right-leaning* curve.[1]

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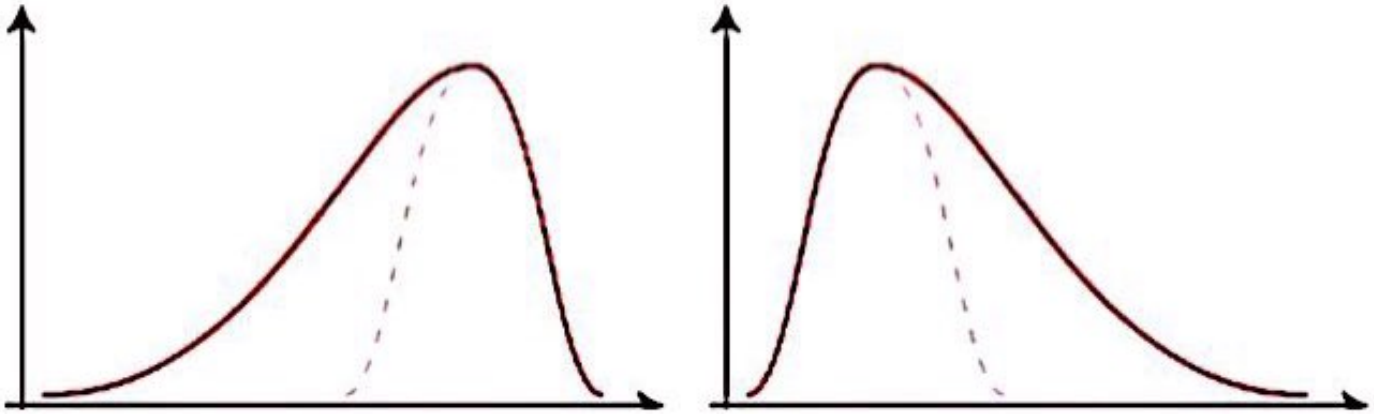
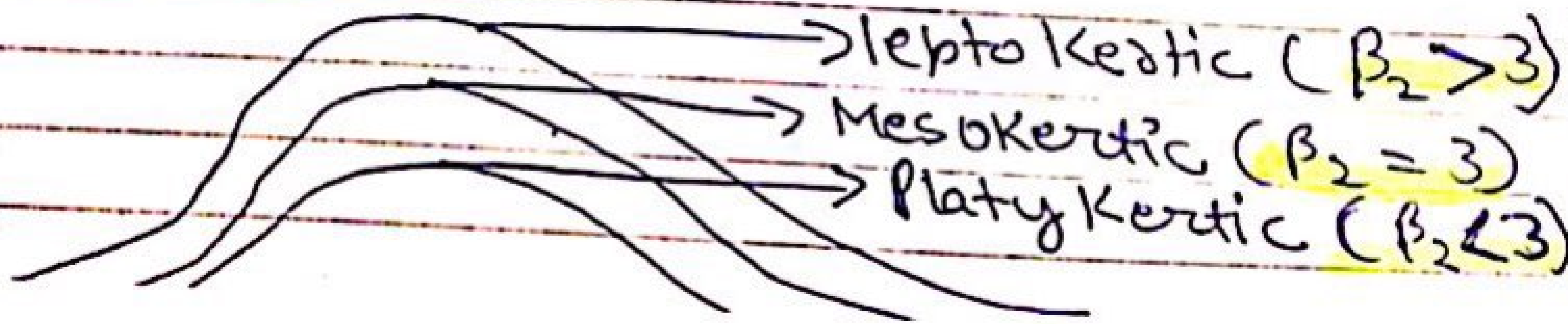
2. *positive skew*: The right tail is longer; the mass of the distribution is concentrated on the left of the figure. The distribution is said to be *right-skewed*, *right-tailed*, or *skewed to the right*, despite the fact that the curve itself appears to be skewed or leaning to the left; *right* instead refers to the right tail being drawn out and, often, the mean being skewed to the right of a typical center of the data. A right-skewed distribution usually appears as a *left-leaning* curve.[1]



KURTOSIS → Peakness

* It is useful to measure the peakness of any distribution series which are classified in the following 3 catagories :—

(i) leptoKertic → high
(ii) MesoKertic → Normally distributed
(iii) PlatyKertic → Below.



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KURT function : This article describes the formula syntax and usage of t KURT function in Microsoft Excel.

Description : Returns the kurtosis of a data set. Kurtosis characterizes t relative peakedness or flatness of a distribution compared with the norm distribution. Positive kurtosis indicates a relatively peaked distribution. Negati kurtosis indicates a relatively flat distribution.

Syntax : KURT(number1, [number2], ...)

- Kurtosis is defined as :

$$\left\{\frac{n(n+1)}{(n-1)(n-2)(n-3)}\sum\left(\frac{x_i-\bar{x}}{s}\right)^4\right\}-\frac{3(n-1)^2}{(n-2)(n-3)}$$

where s is the sample standard deviation.

Example : Copy the example data in the following table, and paste it in cel of a new Excel worksheet. For formulas to show results, select them, press F2 then press Enter. If you need to, you can adjust the column widths to see al data.

Data		
3		
4		
5		
2		
3		
4		
5		
6		
4		
7		
Formula	**Description**	**Resul**
=KURT(A2:A11)	Kurtosis of the data set above	0.151799

Ans. SKEW function : This article describes the formula syntax and usage of the SKEW function in Microsoft Excel.

Description : Returns the skewness of a distribution.Skewness characterizes the degree of asymmetry of a distribution around its mean. Positive skewness indicates a distribution with an asymmetric tail extending toward more positive values. Negative skewness indicates a distribution with an asymmetric tail extending toward more negative values.

Syntax : SKEW(number1, [number2], ...)

- The equation for skewness is defined as : $\frac{n}{(n-1)(n-2)}\sum\left(\frac{x_i-\bar{x}}{s}\right)$

Example : Copy the example data in the following table, and paste it in cell A1 of a new Excel worksheet. For formulas to show results, select them, press F2, and then press Enter. If you need to, you can adjust the column widths to see all the data.

Data		
3		
4		
5		
2		
3		
4		
5		
6		
4		
7		
Formula	**Description**	**Result**
=SKEW(A2:A11)	Skewness of a distribution of the data set in A2:A11.	0.359543