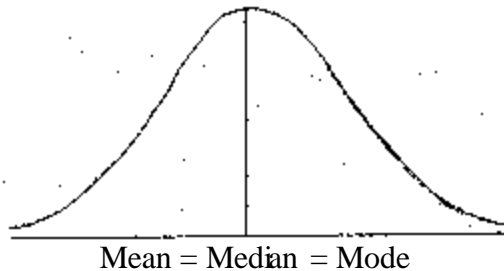


Skewness:

Meaning:

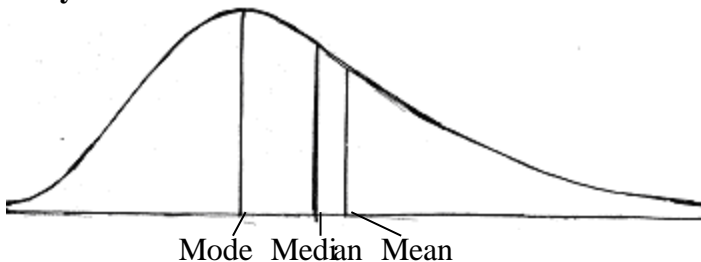
Skewness means 'lack of symmetry'. We study skewness to have an idea about the shape of the curve which we can draw with the help of the given data. If in a distribution $\text{mean} = \text{median} = \text{mode}$, then that distribution is known as symmetrical distribution. If in a distribution $\text{mean} \neq \text{median} \neq \text{mode}$, then it is not a symmetrical distribution and it is called a skewed distribution and such a distribution could either be positively skewed or negatively skewed.

a) Symmetrical distribution:



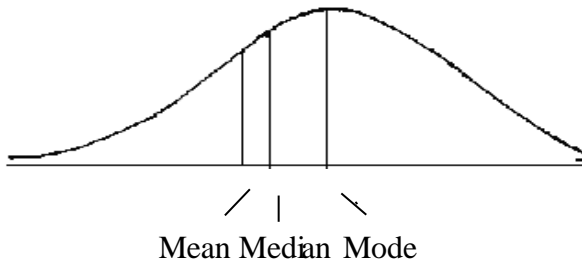
It is clear from the above diagram that in a symmetrical distribution the values of mean, median and mode coincide. The spread of the frequencies is the same on both sides of the center point of the curve.

b) Positively skewed distribution:



It is clear from the above diagram, in a positively skewed distribution, the value of the mean is maximum and that of the mode is least, the median lies in between the two. In the positively skewed distribution, the frequencies are spread out over a greater range of values on the right hand side than they are on the left hand side.

c) Negatively skewed distribution:



It is clear from the above diagram, in a negatively skewed distribution, the value of the mode is maximum and that of the mean is least. The median lies in between the two. In the negatively skewed distribution, the frequencies are spread out over a greater range of values on the left hand side than they are on the right hand side.

Measures of skewness:

The important measures of skewness are

- (i) Karl – Pearson's coefficient of skewness
- (ii) Bowley's coefficient of skewness
- (iii) Measure of skewness based on moments

Karl – Pearson's Coefficient of skewness:

According to Karl – Pearson, the absolute measure of skewness = mean – mode. This measure is not suitable for making valid comparison of the skewness in two or more distributions because the unit of measurement may be different in different series. To avoid this difficulty use relative measure of skewness called Karl – Pearson's coefficient of skewness given by:

$$\text{Karl – Pearson's Coefficient Skewness} = \frac{\text{Mean} - \text{Mode}}{S.D.}$$

In case of mode is ill – defined, the coefficient can be determined by the formula:

$$\text{Coefficient of skewness} = \frac{3(\text{Mean} - \text{Median})}{S.D.}$$

Bowley's Coefficient of skewness:

In Karl – Pearson's method of measuring skewness the whole of the series is needed. Prof. Bowley has suggested a formula based on relative position of quartiles. In a symmetrical distribution, the quartiles are equidistant from the value of the median; i.e.,

Median – Q_1 = Q_3 – Median. But in a skewed distribution, the quartiles will not be equidistant from the median. Hence Bowley has suggested the following formula:

$$\text{Bowley's Coefficient of skewness (sk)} = \frac{Q_3 + Q_1 - 2 \text{ Median}}{Q_3 - Q_1}$$

Kurtosis

The expression kurtosis The expression 'Kurtosis' is used to describe the peakedness of a curve.

The three measures – central tendency, dispersion and skewness describe the characteristics of frequency distributions.

But these studies will not give us a clear picture of the characteristics of a distribution.

As far as the measurement of shape is concerned, we have two characteristics – skewness which refers to asymmetry of a series and kurtosis which measures the peakedness of a normal curve. All the frequency curves expose different degrees of flatness or peakedness. This characteristic of frequency curve is termed as kurtosis. Measure of kurtosis denote the shape of top of a frequency curve. Measure of kurtosis tell us the extent to which a distribution is more peaked or more flat topped than the normal curve, which is symmetrical and bell-shaped, is designated as Mesokurtic. If a curve is relatively more narrow and peaked at the top, it is designated as Leptokurtic. If the frequency curve is more flat than normal curve, it is designated as platykurtic.

L = Lepto Kurtic

M = Meso Kurtic

P = Platy Kurtic

