Statistics Practical

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Contents

Measures of Central Tendency

Important Formulae

- $M_o = 3Me - 2\bar{X}$

Moments, SKewness, and Kurtosis

Problems

Moment Conversion: -1, 5, 20, 90.

The first four moments around 2 of a data set are -1, 5, 20, 90. Determine μ_3 and kurtosis.

Solution

$\mu_1' = \dfrac{\sum_{i=1}^{n}}{n} - 1$

$displaystyle \Rightarrow \dfrac{\sum x_i}{n} - a = -1$

$\Rightarrow \bar{x} - a = a - 1$

Thus, $b = a - k = a - a + 1 = 1$

Without knowing the initial origin, we can compute central moments, but not other raw moments.

Time Series

Concept of time series

A time series is a collection of observations arranged chronologically (belonging to different time period, e.g., week, month, year etc.)

According to the Australian Bureau of Statistics,

"A time series is a collection of observations of well-defined data items obtained through repeated measurements over time."

Mathematically, a time series is $Y_t = f(t); t = t_1, t_2, \cdots, t_n$

Examples

i. No. of accidents by day
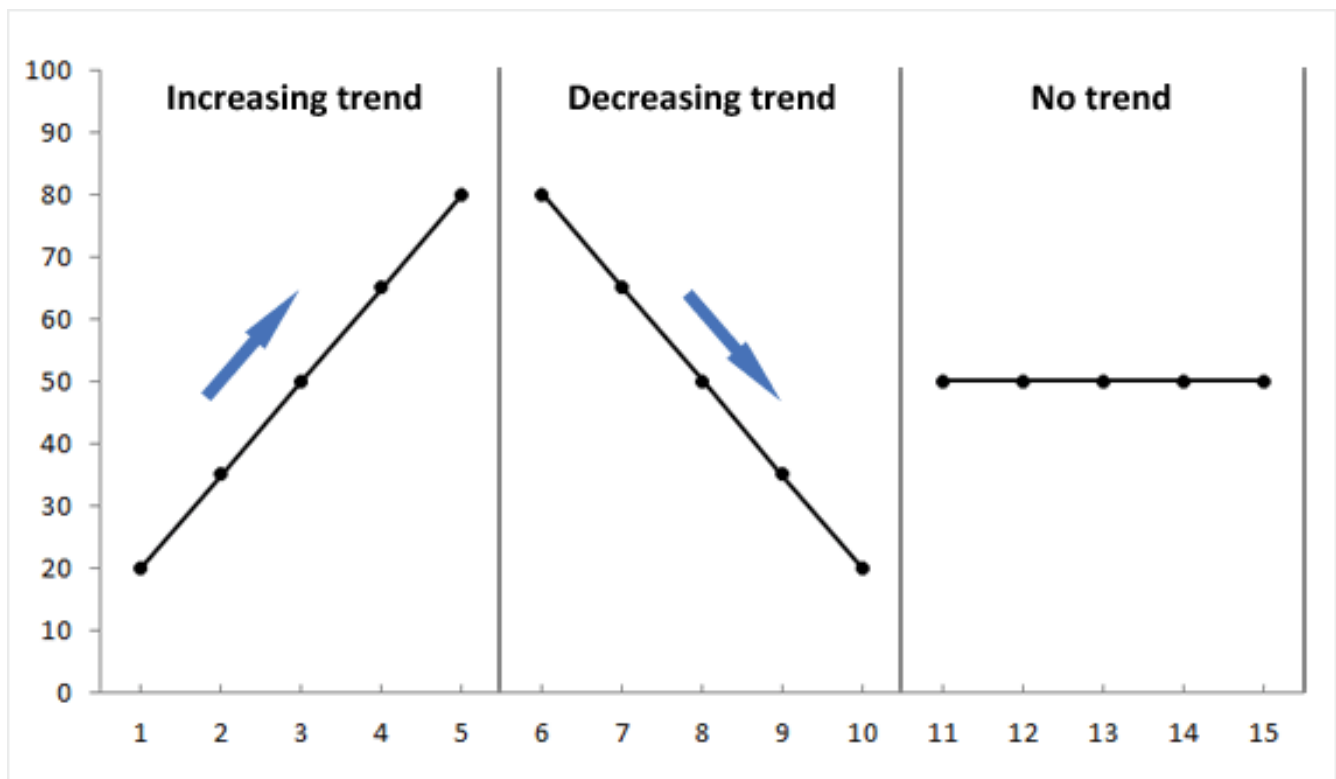ii. Tea production in Bangladesh by year

Components of time series

a. Trend
b. Seasonal variation
c. Cyclic variation
d. Irregular/random variation

Elaboration on the concepts

Trend

Increase of decrease in the values over time. There are two types of trends.

i. Upward trend
ii. Downward trend

Both types can be further divided into two kinds of trends.

    i. Linear trend
   ii. Non-linear trend

Seasonal variation

Changes in values due to season within a year, due to climate or festival.

Examples

    i. The increase of demand of dates during Ramadan
   ii. The increase of demand of umbrella during the rainy season

Cyclic variation

Recurrent upward or downward movements, when the period of cycle is greater than a year, but the period is not fixed.