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## Statistical Methods: Ratio, Rates, Percentage and Mean

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Systematic presentation we reduce the meaningless mass of statistical data through the tables, charts etc.

- Sometimes we need to compare one table with another table and one frequency distribution with another frequency distribution.
- At that time, we require tools or methods to make such comparisons.
- One set of statistical tools found in ratio, rates and percentages.
- Another set of statistical tools is found in the averages or measures of central tendency.

### Ratio

- Comparing two numerical values by division is the ratio method of comparison.
- Ratio is the relationship between two quantities which called terms.
- It is necessary to determine (a) What is compared (First term) and with which it is to be compared (Second term) .
- Calculated by dividing the first term by the second term.
- Expressed in words, symbol and fraction.
- Ratio will be reverse when first and second terms are interchanged.

$$\text{Ratio} = \frac{\text{First term}}{\text{Second term}}$$

$$\text{For example:} = \frac{\text{Price of pen A}}{\text{Price of pen B}} = \frac{₹.6}{₹.2} = 3$$

### Forms of Expression of Ratio

- **In words:** The ratio of ₹ 6 to ₹ 2
- **In symbol:** ₹ 6: ₹ 2
- **In fraction:**  $\frac{₹.6}{₹.2}$

### Examples of Certain Ratios Used in Economics

Ratio of national income to population = $\frac{\text{National Income}}{\text{Population}}$ = Per Capita Income	Input-output Ratio = $\frac{\text{Input}}{\text{Output}}$ = Input per unit of output
Ratio of population to land areas = $\frac{\text{Population}}{\text{Land area}}$ = Density to population	Ratio of saving to income = $\frac{\text{Saving}}{\text{Income}}$ = Propensity to save
Ratio of consumption to Income = $\frac{\text{Consumption expenditure}}{\text{Income}}$ = Propensity to consume	
Table Shows the Examples of Certain Ratios Used in Economics	

### Rates

- In economic rates like rate of economic growth, rate of growth of population, birth rate, death rate, agricultural rate is calculated.
- **For example:** Rate of yield per hectare of a crop.
- Rate of yield (in kg.) per hectare of crop =  $\frac{\text{Total production of crop (kgs.)}}{\text{Total area (hectares) under crop}}$

### Rates vs. Ratio

- Rate and ratio calculation method are generally same.
- Rate is the ratio between two magnitudes shown over a period of time.
- Rate can be expressed besides per unit, per 100,1000, lakh etc and even higher.

### Need for Arbitrary Base in Rate

- Value of ratio per unit sometimes is so small.

- Small base fails to convey importance of the rate or ratio.
- Need to raise the base.
- Arbitrary higher base for calculation of rate is chosen when:
  - Value of ratio is very small
  - Need to avoid fractions in comparisons

### Percentage

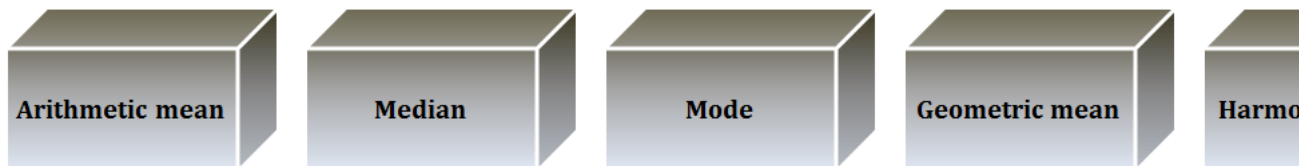
- Percentage is type of rate or ratio with base 100.
- Every ratio per unit when multiply by 100 is converted into percentage.

$$\text{Percentage} = \frac{\text{First Term}}{\text{Second Term}} \times 100$$

### Mean

#### Measures of Central Tendency

- Clustering of items values in the central part of the distribution is known as central tendency.
- Measure of central tendency means a value where the concentration of the items or values is found to be greatest.
- **Average** also called measures of central tendency.
- It is a value which is typical or representative of a set of data.
- Average can be obtained by using 5 different measures of central tendency:



- Average will help to compare its various sections according to their performance.