

Basic Formulas- Ch-13 Statistics

Three Methods to Find Mean (Average):

1. Direct Method:

$$\text{Mean} = \frac{\sum x}{n}$$

(Used for ungrouped or small grouped data)

2. Assumed Mean Method:

$$\text{Mean} = A + \frac{\sum fd}{\sum f}$$

Where A = assumed mean, d = x - A

3. Step-Deviation Method:

$$\text{Mean} = A + \frac{\sum fu}{\sum f}$$

Where $u = \frac{x-A}{h}$, and h = class width

✦ Formula for Mode (for grouped data):

$$\text{Mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

Where:

- l = lower boundary of modal class
 - f₁ = frequency of modal class
 - f₀ = frequency before modal class
 - f₂ = frequency after modal class
 - h = class width
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📊 Two Formulas of Median (Grouped Data):

Even & Odd Formula

✓ **Step 1:** Arrange the data in **ascending order**.

12 If the number of values (n) is ODD:

Use the formula:

$$\text{Median} = \text{Value at position } \left(\frac{n+1}{2}\right)$$

12 If the number of values (n) is EVEN:

Use the formula:

$$\text{Median} = \left(\frac{\frac{n}{2} \text{th value} + \left(\frac{n}{2} + 1\right) \text{th value}}{2} \right)$$

1. For Continuous Frequency Table:

$$\text{Median} = l + \left(\frac{\frac{n}{2} - F}{f} \right) \times h$$

Where:

- l = lower boundary of median class
- F = cumulative frequency before median class
- f = frequency of median class
- h = class width

2. Empirical Relationship Formula (if mode and mean are known):

$$3 \text{ Median} = 2 \text{ Mean} + \text{Mode}$$