Formulas from the Video:

1. Mean (Arithmetic Mean)

- **Raw Data (Ungrouped):**

$$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$$

where

x_i = each individual data point

n = number of observations

- **Grouped Data:**

$$\bar{x} = \frac{\sum_{i=1}^{k} f_i x_i}{\sum_{i=1}^{k} f_i}$$

where

f_i = frequency of class i

x_i = class midpoint of class i

k = number of classes

2. Median

- **For Ungrouped Data:**
  - If n (number of observations) is odd:

$$\text{Median} = X_{\frac{n+1}{2}}$$

$X_{\frac{n+1}{2}}$ is the middle value when data are sorted.

  - If n is even:

$$\text{Median} = \frac{X_{\frac{n}{2}} + X_{\frac{n}{2}+1}}{2}$$

- **For Grouped Data:**

$$\text{Median} = L + \left(\frac{\frac{N}{2} - F}{f_m} \right) \times h$$

where

L = lower boundary of median class

N = total frequency ($\sum f_i$)

F = cumulative frequency before median class

f_m = frequency of median class

h = class width (size)

3. Mode

- **For Ungrouped Data:**

$$\text{Mode} = \text{Value with highest frequency}$$

- **For Grouped Data (Using Modal Formula):**

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

where

L = lower boundary of modal class

f_1 = frequency of modal class

f_0 = frequency of class before modal class

f_2 = frequency of class after modal class

h = class width

Additional Useful Relationships:

- **Relation (Empirical formula) between Mean, Median, Mode:**

$$\text{Mode} = 3 \times \text{Median} - 2 \times \text{Mean}$$

or

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