

Problem 1: Co-efficient of variation of two series are 75% and 90% and their standard deviations 15 and 18. Find their mean.

Solution: Co-efficient of variance = $\frac{\sigma}{\bar{x}} \times 100 \Rightarrow$ for first series $75 = \frac{15}{\bar{x}} \times 100 \Rightarrow \bar{x} = 20$
 and for second series $90 = \frac{18}{\bar{x}} \times 100 \Rightarrow \bar{x} = 20$.
 Thus both the series have same mean i.e. 20.

Problem 2: The S.D of the variate x is σ . Find the S.D of the variable $\frac{ax+b}{c}$; a, b, c are constant.

Solution: Let $y = \frac{ax+b}{c} \Rightarrow y = \frac{a}{c}x + \frac{b}{c} \Rightarrow y = Ax + B$
 where $A = \frac{a}{c}$ and $\frac{b}{c} \Rightarrow \bar{y} = A\bar{x} + B$ and hence
 $y - \bar{y} = Ax + B - (A\bar{x} + B) = A(x - \bar{x}) \Rightarrow (y - \bar{y})^2 = A^2(x - \bar{x})^2$
 $\Rightarrow \Sigma(y - \bar{y})^2 = A^2 \Sigma(x - \bar{x})^2 \Rightarrow n\sigma_y^2 = A^2(n\sigma_x^2) \Rightarrow \sigma_y = |A|\sigma_x$.
 Hence S.D is multiplied by $|A| = \left| \frac{a}{c} \right|$.

Problem 3: The number of observations in a group is 40. If the average of first 10 is 4.5 and that of the remaining 30 is 3.5, then find the average of the whole group?

Solution: $\frac{x_1 + x_2 + \dots + x_{10}}{10} = 4.5$
 and $\frac{x_{11} + x_{12} + \dots + x_{40}}{30} = 3.5$
 $\Rightarrow \frac{x_1 + x_2 + \dots + x_{40}}{40} = \frac{4.5 \times 10 + 3.5 \times 30}{10 + 30} = \frac{150}{40} = \frac{15}{4}$.

Problem 4: For a set of 100 observations, taking assumed mean as 4, the sum of the deviations is - 11 cm, and the sum of the squares of these deviations is 275 cm². Find the coefficient of variation.

Solution: and $\sigma = \sqrt{\frac{\Sigma d^2}{n} - \left(\frac{\Sigma d}{n}\right)^2} = \sqrt{\frac{275}{100} - \left(-\frac{11}{100}\right)^2} = 1.6$.
 Coefficient of Variation = $\frac{\sigma}{\bar{x}} \times 100 = \frac{1.6}{3.89} \times 100 = 41.13\%$.