Consider the following population of five numbers: 5, 8, 10, 12, 15. Calculate the range, variance, and standard deviation of this population.

Solution

The range is the highest score minus the lowest score. The highest number is 15 and the lowest number is 5, so $15 - 5$ equals 10; the range is 10.

The variance of this population is

$$\sigma^2 = \frac{\sum X^2 - \frac{(\sum X)^2}{N}}{N}.$$

$$\sum X^2 = 5^2 + 8^2 + 10^2 + 12^2 + 15^2 = 558.$$

$$\sum X = 5 + 8 + 10 + 12 + 15 = 50.$$

$$\frac{(\sum X)^2}{N} = \frac{50^2}{5} = 500.$$

$$\sigma^2 = \frac{558 - 500}{5} = 11.6.$$

The standard deviation of this population is the square root of the variance of this population:

$$\sigma = \sqrt{\sigma^2} = \sqrt{11.6} = 3.4.$$