

Find the standard deviation of the distribution 12,6,7,3,15,10,18,5  
a. 4.87 b. 4.97 c. 2.21 d. 5.81

**Solution**

The standard deviation of the discrete distribution is

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2},$$

where  $\bar{x} = \frac{\sum_{i=1}^N x_i}{N}$  - the mean of distribution.

For our distribution:

$$\bar{x} = \frac{12 + 6 + 7 + 3 + 15 + 10 + 18 + 5}{8} = 9.5,$$

Variance

$$\begin{aligned} Var &= \frac{1}{N} \sum_{i=1}^N (x_i - \bar{x})^2 = \frac{1}{8} ((12 - 9.5)^2 + (6 - 9.5)^2 + (7 - 9.5)^2 + (3 - 9.5)^2 \\ &\quad + (15 - 9.5)^2 + (10 - 9.5)^2 + (18 - 9.5)^2 + (5 - 9.5)^2) \end{aligned}$$

$$Var = \frac{1}{8} (2.5^2 + 3.5^2 + 2.5^2 + 6.5^2 + 5.5^2 + 0.5^2 + 8.5^2 + 4.5^2) = 23.75.$$

The standard deviation of the distribution

$$\sigma = \sqrt{Var} = \sqrt{23.75} = 4.87.$$

**Answer: a. 4.87.**