

## Scientific Computing

### Mean, Variance, and Standard Deviation Worksheet

Assume set X contains these numbers: {3, 9, 0, 2, 17, 8}

Question 1: How many elements are in set X?

$$n = 6$$

Question 2: What is the mean ( $\mu$ ) of set X?

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

$$\mu = \frac{(3 + 9 + 0 + 2 + 17 + 8)}{6} = \frac{39}{6} = 6.5$$

Question 3: What is the variance ( $\sigma^2$ ) of set X?

$$\sigma^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \mu)^2$$

$$\sigma^2 = \frac{(3 - 6.5)^2 + (9 - 6.5)^2 + (0 - 6.5)^2 + (2 - 6.5)^2 + (17 - 6.5)^2 + (8 - 6.5)^2}{6}$$

$$\sigma^2 = \frac{12.25 + 6.25 + 42.25 + 20.25 + 110.25 + 2.25}{6} = \frac{193.5}{6} = 32.25$$

Question 4: What is the standard deviation ( $\sigma$ ) of set X?

$$\sigma = \sqrt{\sigma^2}$$

$$\sigma = \sqrt{32.25} = 5.678908$$