

For questions 1—3, use the *population data* given below.

22 33 38

1. What is the correct formula for standard deviation?

$$\sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}}$$

2. Determine the standard deviation of the data set.

1. Since the data is population data
2. 7.14

We will need the mean, $\mu = \frac{\sum x}{N} = \frac{22 + 33 + 38}{3} = 31$

x	$x - \mu$	$(x - \mu)^2$
22	$22 - 31 = -9$	$(-9)^2 = 81$
33	$33 - 31 = 2$	$2^2 = 4$
38	$38 - 31 = 7$	$7^2 = 49$

$$\sum (x - \mu)^2 = 81 + 4 + 49 = 134$$

$$\text{Then } \sigma = \sqrt{\frac{\sum (x - \mu)^2}{N}} = \sqrt{\frac{134}{3}} \approx 6.68$$

3. Determine the variance of the data set.

3. $\sigma^2 \approx 44.66$

For questions 4–6, use the *sample data* given below. Environmental scientists measured the greenhouse gas emissions of a sample of cars. The amounts listed below are in tons (per year), expressed as CO₂ equivalents.

7.2 7.1 7.4 7.9 6.5 7.2 8.2 9.3

4. Determine the range of the data. $9.3 - 6.5$
5. What is the correct formula for standard deviation?
6. Determine the standard deviation of the data set.

4. 2.8

5. $s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$

6. 0.8586

$\bar{x} = 7.6$

x	$x - \bar{x}$	$(x - \bar{x})^2$
7.2	-1.1	1.21
7.1	-0.5	0.25
7.4	-0.4	0.16
7.9	-0.4	0.16
6.5	-0.2	0.04
7.2	0.3	0.09
8.2	0.6	0.36
9.3	1.7	0.49
		$\sum(x-\bar{x})^2 = 5.16$

$$s = \sqrt{\frac{\sum(x-\bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{5.16}{7}}$$

$$\approx 0.8586$$

7. Determine the variance of the data set. $s^2 \approx 0.7371$ 7. 0.7371

8. Use your calculator to determine the mean, standard deviation, variance and range for the given data set. Double check that your values from questions 4–6 are correct!

