

## LEARNING CHECK

1. In this chapter's first Learning Check, we used data in which a researcher surveyed 10 undergraduate psychology majors about their study behaviors. Here again is that list of the number of hours they spent studying on the weekend:

6	5	3	4	9
7	3	7	8	3

- a) Calculate the range.

A: Highest score – lowest score =  $9 - 3 = 6$

- b) Calculate the variance.

A: 4.94

- c) Calculate the standard deviation.

A: 2.22

2. Why is “sample size – 1” used when calculating the sample standard deviation?

A: We almost always work with sample data. Because a sample is smaller than its population, the sample will have less variability than its population. When calculating a sample standard deviation, we must correct for this state of affairs by “inflating” our calculation to try and reflect the population. With sample data, we subtract 1 from the sample size, thus, decreasing the denominator of the calculation. With a smaller denominator, we are increasing the quotient (increasing variability in describing the dataset).

3. The value of one score in a dataset is changed from 20 to 30. Which measure(s) of variability is (are) certain to be changed?

- a) the range.
- b) the variance.
- c) the range and standard deviation.
- d) the variance and standard deviation.

A: d

4. Explain your answer to question 3.

A: The range needs only the highest and lowest scores in the dataset for its calculation. Therefore, it may not change if that one score being changed isn't the highest or lowest one. However, the variance uses all numbers in a dataset in its calculation. Therefore, it is bound to change when one score is changed. The standard deviation is the square root of the variance, so it too must change when one score is changed.

5. Which measure of variability would be more affected by an outlier: the range or the standard deviation?

A: the range