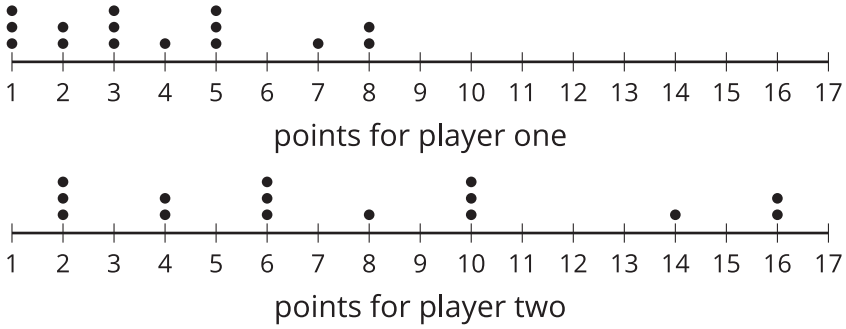
The first dot plot shows the number of points that a player on a basketball team made during each of 15 games. The second dot plot shows the number of points scored by another player during the same 15 games.




The data in the first plot has a mean of approximately 3.87 points and standard deviation of about 2.33 points. The data in the second plot has a mean of approximately 7.73 points and a standard deviation of approximately 4.67 points. The second distribution has greater variability than first distribution because the data is more spread out. This is shown in the standard deviation for the second distribution being greater than the standard deviation for the first distribution.

Standard deviation is calculated using the mean, so it makes sense to use it as a measure of variability when the mean is appropriate to use for the measure of center. In cases where the median is a more appropriate measure of center, the interquartile range is still a better measure of variability than standard deviation.

# Lesson 13 Practice Problems

## Problem 1

### Statement

Three drivers competed in the same fifteen drag races. The mean and standard deviation for the race times of each of the drivers are given.

Driver A had a mean race time of 4.01 seconds and a standard deviation of 0.05 seconds.

Driver B had a mean race time of 3.96 seconds and a standard deviation of 0.12 seconds.

Driver C had a mean race time of 3.99 seconds and a standard deviation of 0.19 seconds.

a. Which driver had the fastest typical race time?

b. Which driver's race times were the most variable?

c. Which driver do you predict will win the next drag race? Support your prediction using the mean and standard deviation.

## Solution

a. Driver B

b. Driver C

c. Sample response: I predict driver C will win. Even though driver C's mean race time is in between the other two mean race times, driver C shows more variability. This means that driver C sometimes is relatively slow, but sometimes is relatively fast. (Note that one could also reasonably predict driver B would win, since they have the smallest mean and the standard deviation of their race times is smaller than that of driver C.)

## Problem 2

### Statement

The widths, in millimeters, of fabric produced at a ribbon factory are collected. The mean is approximately 23 millimeters and the standard deviation is approximately 0.06 millimeters.

Interpret the mean and standard deviation in the context of the problem.

## Solution

Sample response: The width of the fabric is typically 23 millimeters. The standard deviation of 0.06 millimeters means that there was very little variability. The width of most of the fabric is between 22.94 and 23.06 millimeters.

## Problem 3

### Statement

Select **all** the statements that are true about standard deviation.

A. It is a measure of center.

B. It is a measure of variability.

C. It is the same as the MAD.

D. It is calculated using the mean.

E. It is calculated using the median.

## Solution

["B", "D"]

## Problem 4

### Statement

The number of different species of plants in some gardens is recorded.

1 2 3 4 4 5 5 6 7 8

a. What is the mean?

b. What is the standard deviation?

## Solution

a. 4.5 species

b. Approximately 2.06 species

(From Unit 1, Lesson 12.)

## Problem 5

### Statement

A set of data has ten numbers. The mean of the data is 12 and the standard deviation is 0. What values could make up a data set with these statistics?

## Solution

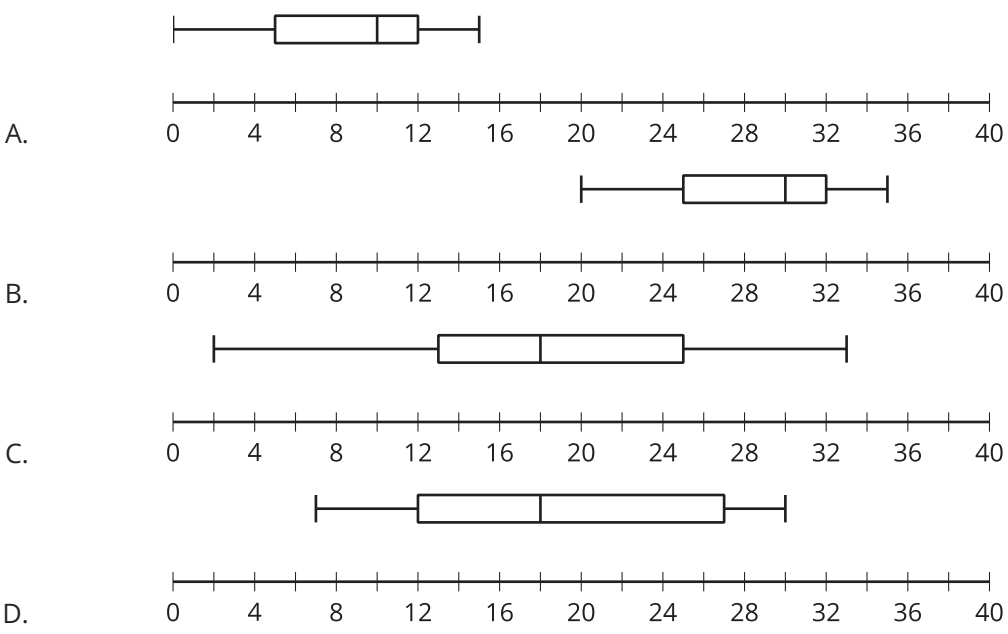
12, 12, 12, 12, 12, 12, 12, 12, 12, 12

(From Unit 1, Lesson 12.)

## Problem 6

### Statement

Which box plot has the largest interquartile range?




## Solution

D

(From Unit 1, Lesson 11.)

## Problem 7

### Statement

a. What is the five-number summary for 1, 3, 3, 3, 4, 8, 9, 10, 10, 17?

b. When the maximum, 17, is removed from the data set, what is the five-number summary?

## Solution

a. 1, 3, 6, 10, 17 (Minimum, Q1, Median, Q3, Maximum)

b. 1, 3, 4, 9.5, 10 (Minimum, Q1, Median, Q3, Maximum)

(From Unit 1, Lesson 9.)