7-5 Box-and-Whisker Plots

Warm Up

Problem of the Day

Lesson Presentation

Warm Up

Use the data below for Questions 1-4.

14, 25, 37, 53, 26, 12, 70, 31

1. What is the mean? 33.5

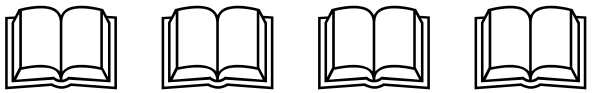
2. What is the median? 28.5

3. What is the mode? none

4. What is the range? 58

Problem of the Day

If the sixth-graders checked out 160 books, how many does each symbol in this pictograph represent?

Library Books Checked Out	
Sixth Grade	
Seventh Grade	
Eighth Grade	

32 books

7-5 Box-and-Whisker Plots

Learn to display and analyze data in box-and-whisker plots.

Vocabulary

box-and-whisker plot

lower quartile

upper quartile

interquartile range

7-5 Box-and-Whisker Plots

A **box-and-whisker plot** uses a number line to show the distribution of a set of data.

To make a box-and-whisker plot, first divide the data into four equal parts using *quartiles*. The median, or *middle quartile*, divides the data into a lower half and an upper half. The median of the lower half is the **lower quartile**, and the median of the upper half is the **upper quartile**.

Caution!

To find the median of a data set with an even number of values, find the mean of the two middle values.

Additional Example 1: Making a Box-and-Whisker Plot

Use the data to make a box-and-whisker plot.

~~73~~ ~~67~~ ~~75~~ ~~81~~ ~~67~~ ~~75~~ ~~85~~ ~~69~~

Step 1: Order the data from least to greatest. Then find the least and greatest values, the median, and the lower and upper quartiles.

67 67 69 73 75 75 81 85

The least value.

The greatest value.

~~67~~ ~~67~~ ~~69~~ $\frac{73+75}{2}$ ~~75~~ ~~81~~ ~~85~~

Find the median.

$=74$

Additional Example 1 Continued

Step 1 Continued

67 | 67 69 | 73 | 75 | 75 81 | 85

lower quartile = $\frac{67 + 69}{2} = 68$

upper quartile = $\frac{75 + 81}{2} = 78$

Additional Example 1 Continued

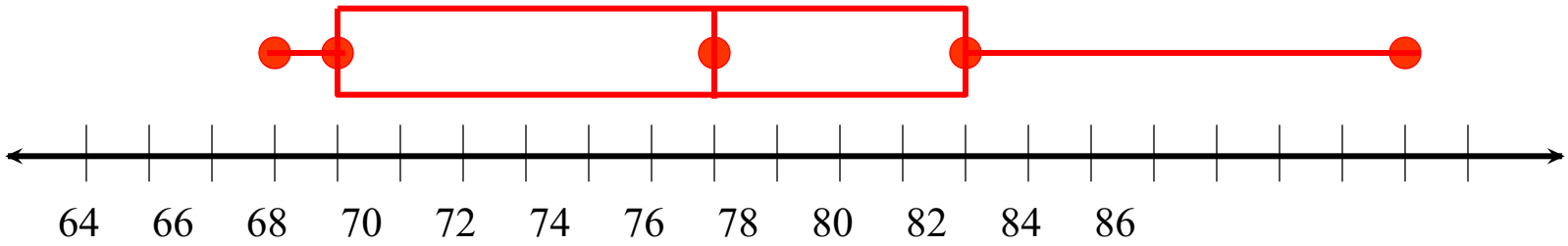
Step 2: Draw a number line.

Above the number line, plot points for each value in Step 1.

Step 3: Draw a box from the lower to the upper quartile.

Inside the box, draw a vertical line through the median.

Then draw the "*whiskers*" from the box to the least and greatest values.



Check It Out: Example 1

Use the data to make a box-and-whisker plot.

42 22 31 27 24 38 35

Step 1: Order the data from least to greatest. Then find the least and greatest values, the median, and the lower and upper quartiles.

22 24 27 31 35 38 42

The least value.

The greatest value.

22 24 27 31 35 38 42

The median.

22 24 27 31 35 38 42

The upper and lower quartiles.

Check It Out: Example 1 Continued

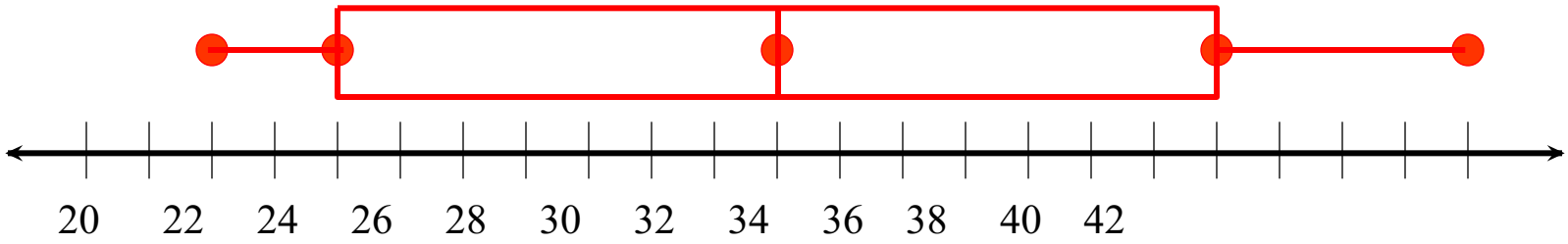
Step 2: Draw a number line.

Above the number line, plot a point for each value in Step 1.

Step 3: Draw a box from the lower to the upper quartile.

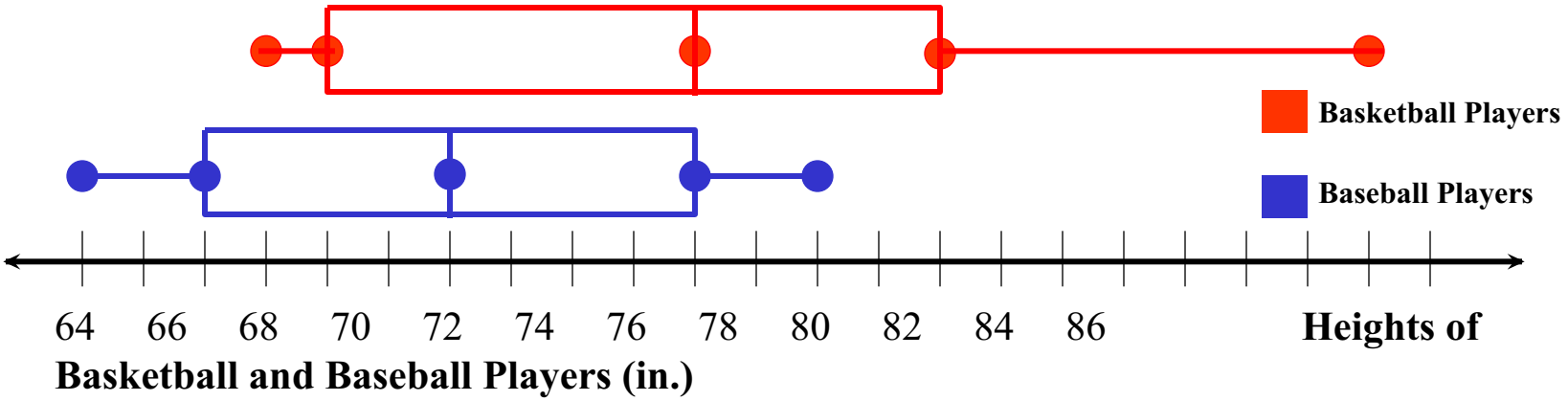
Inside the box, draw a vertical line through the median.

Then draw the "*whiskers*" from the box to the least and greatest values.



Additional Example 2A: Comparing Box-and-Whisker Plot

Use the box-and-whisker plots below to answer each question.

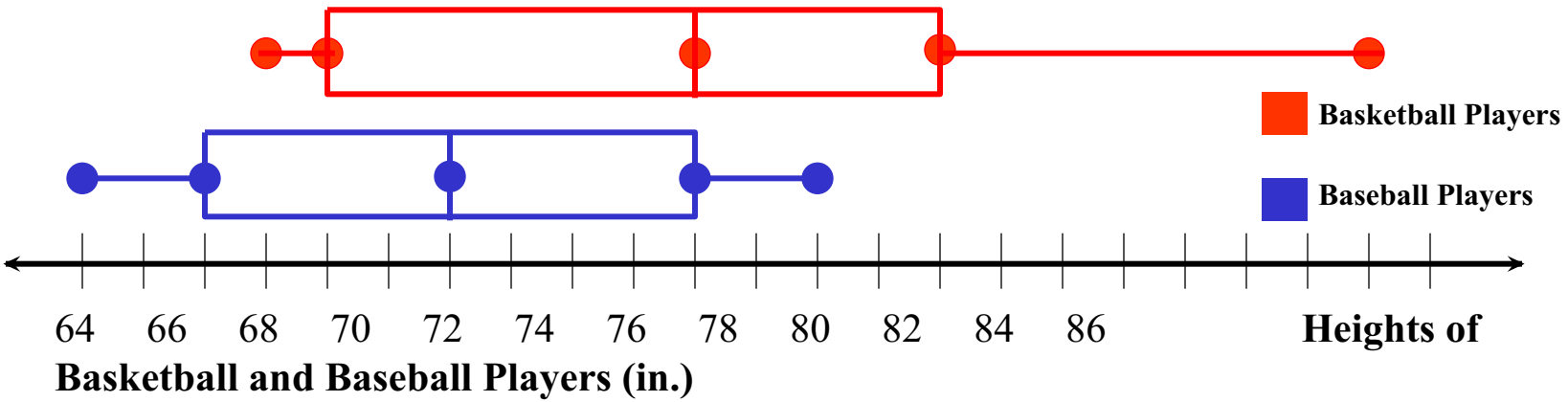


Which set of heights of players has a greater median?

The median height of basketball players, about 74 inches, is greater than the median height of baseball players, about 70 inches.

Additional Example 2B: Comparing Box-and-Whisker Plot

Use the box-and-whisker plots below to answer each question.

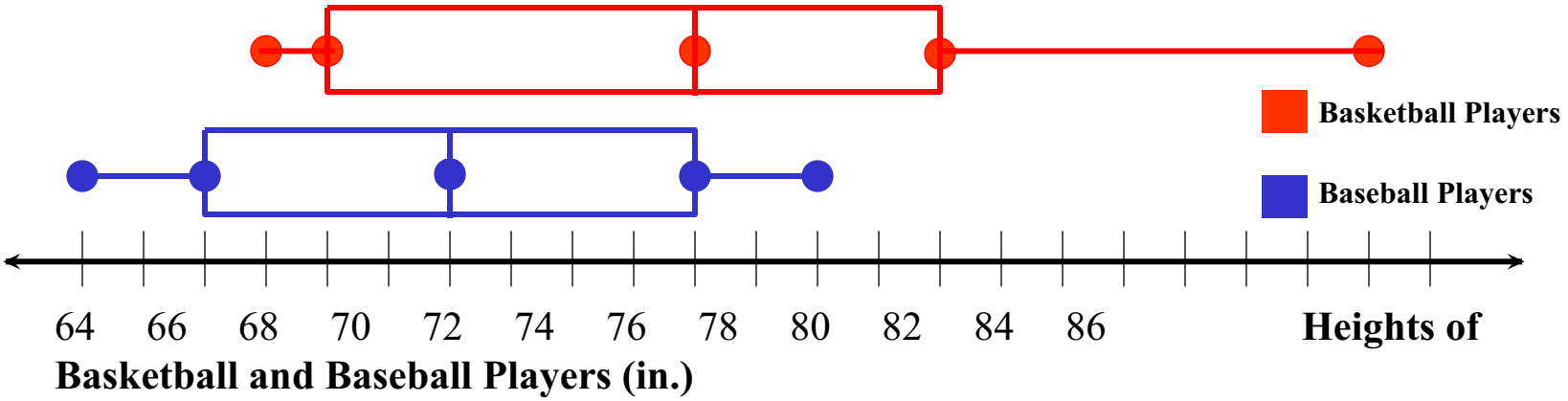


Which players have a greater interquartile range?

The basketball players have a longer box, so they have a greater interquartile range.

Additional Example 2C: Comparing Box-and-Whisker Plot

Use the box-and-whisker plots below to answer each question.

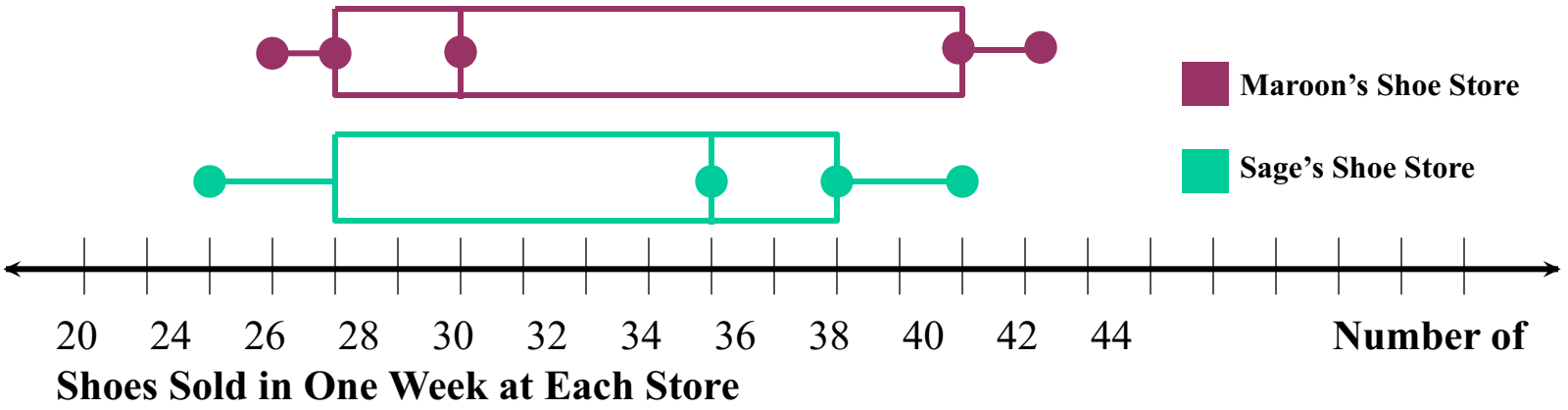


Which group of players has more predictability in their height?

The range and interquartile range are smaller for the baseball players, so the heights for the baseball players are more predictable.

Check It Out: Example 2A

Use the box-and-whisker plots below to answer each question.

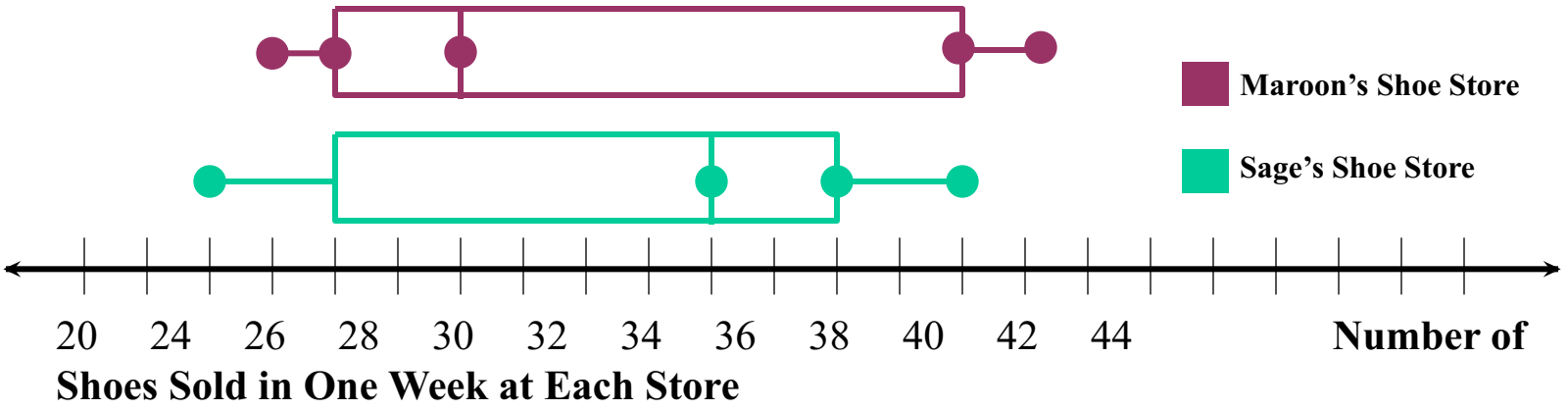


Which shoe store has a greater median?

The median number of shoes sold in one week at Sage's Shoe Store, about 32, is greater than the median number of shoes sold in one week at Maroon's Shoe Store, about 28.

Check It Out: Example 2B

Use the box-and-whisker plots below to answer each question.

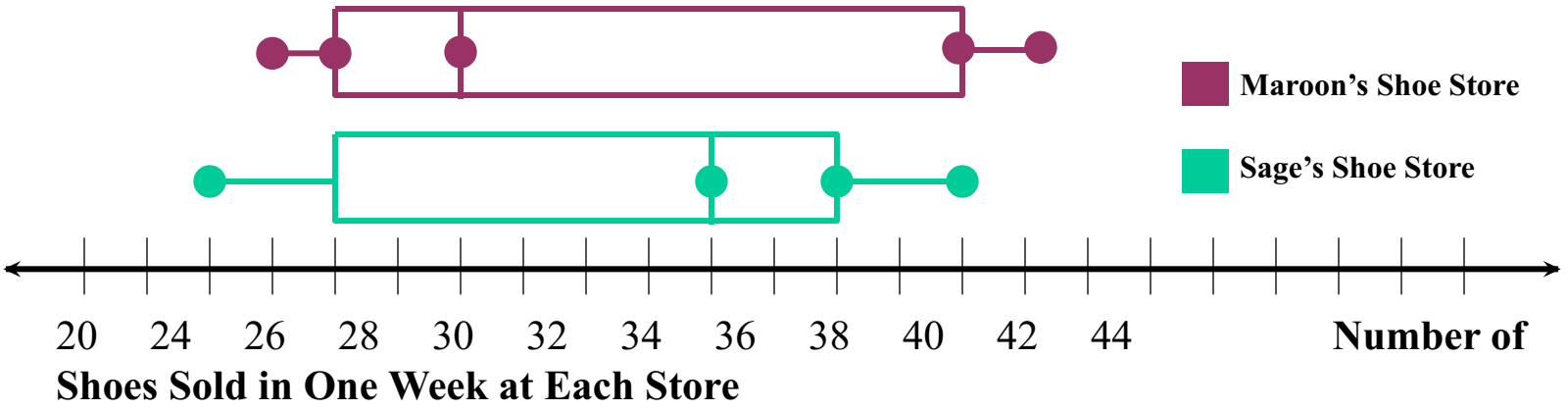


Which shoe store has a greater interquartile range?

Maroon's shoe store has a longer box, so it has a greater interquartile range.

Check It Out: Example 2C

Use the box-and-whisker plots below to answer each question.



Which shoe store appears to be more predictable in the number of shoes sold per week?

The range and interquartile range are smaller for Sage's Shoe Store, so the number of shoes sold per week is more predictable at. Sage's Shoe Store.

Lesson Quiz: Part I

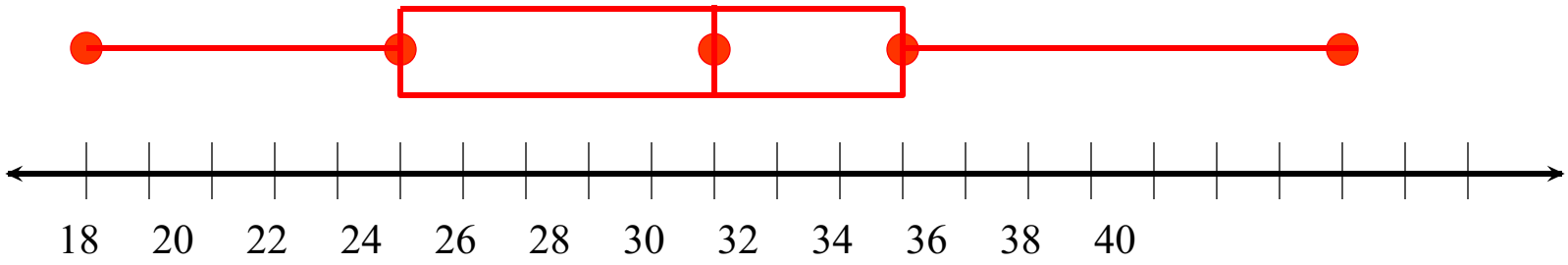
Use the data for Questions 1-3.

24, 20, 18, 25, 22, 32, 30, 29, 35, 30, 28, 24, 38

1. Create a box-and-whisker plot for the data.

2. What is the range? 20

3. What is the 3rd quartile? 31



Lesson Quiz: Part II

4. Compare the box-and-whisker plots below. Which has the greater interquartile range?

They are the same.