

Chapter 9	Statistical Measures	
Date:	9.4 Measures of Variation	
Essential Question	How can you describe the spread of a data set?	
Vocab	Word	Definition
	measure of variation	a measure that describes the distribution of a data set
	range	the difference between the greatest value and the least value The <u>range</u> is a measure of variation. Example: 14, 25, 24, 11, 18, 19, 8, 15 largest number: 25 smallest number: 8 $25 - 8 = 17$ 17 is the range.

- 1) The table shows the lengths of several Burmese pythons captured for a study. Find and interpret the range of their lengths.

Lengths (feet)	
18.5	8
11	10
14	15.5
12.5	6.25
16.25	5

Step 1: Locate the greatest and least number in the data set.

greatest: 18.5

least: 5

Step 2: Subtract the least number from the greatest number.

The range is $18.5 - 5 = 13.5$ feet. This means that the lengths vary by no more than 13.5 feet.

Complete number 1 on your notes page.

- 1) The ages of people in line for a roller coaster are
15, 17, 21, 32, 41, 30, 25, 52, 16, 39, 11, and 24.**

Find and interpret the range of their ages.

Step 1: Locate the greatest and least number in the data set.

The greatest number is 52.

The least number is 11.

Step 2: Subtract the least number from the greatest number.

The range is $52 - 11 = 41$.

Step 3: Interpret the range of ages.

This means the ages vary by no more than 41 years.

Key Ideas #1

Quartiles of a data set divide the data into FOUR EQUAL parts.

*Remember the median divides the data into two halves.

data: 24, 36, 18, 30, 32, 37, 21, 31, 22, 28

First, list the data from least to greatest.

18, 21, 22, 24, 28, | 30, 31, 32, 36, 37

Next, find the median. 29 is the median

Half of the data is below 29, half is above 29.

Then, find the halfway point in the lower and upper halves.

18, 21, (22), 24, 28,	30, 31, (32), 36, 37
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22 is the first quartile, Q1. 32 is the third quartile, Q3

Key Ideas #2

interquartile range The difference between the third quartile and first quartile is the interquartile range. (IQR)

$$Q^3 - Q^1 = \text{IQR}$$

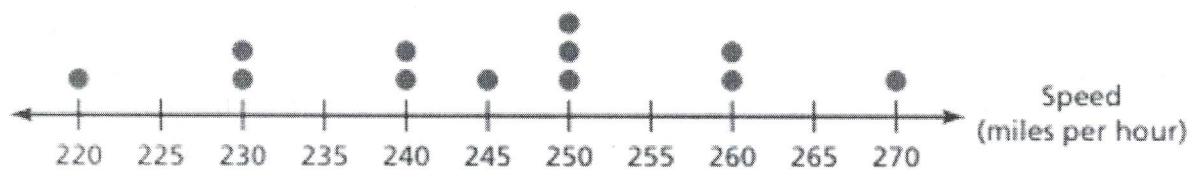
18, 21, (22), 24, 28, | 30, 31, (32), 36, 37

$$32 - 22 = 10$$

This means that the range of the middle half of the data is 10. The interquartile range usually gives a better picture of the data set than the full range because it doesn't include any outliers.

Complete numbers 2 and 3 in your composition book.

- 2) The dot plot shows the top speeds of 12 sports cars.
Find and interpret the interquartile range of the data.



Write the data in order from least to greatest.

220, 230, 230, 240, 240, 245, 250, 250, 250, 260, 260, 270

Find your median, first quartile and third quartile.

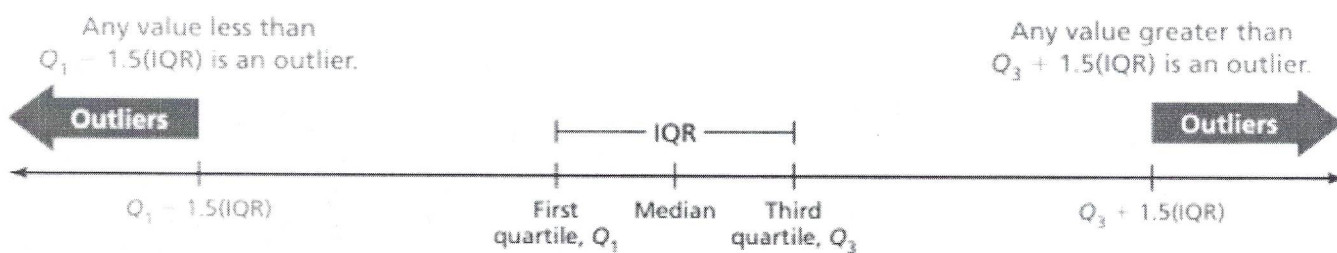
The median is $245 + 250 = 495 \div 2 = 247.5$ (purple line)

The first quartile is $230 + 240 = 470 \div 2 = 235$ (black circle)

The third quartile is $250 + 260 = 310 \div 2 = 255$ (black circle)

Interpret: The interquartile range is $255 - 235 = 20$. The top speeds of the middle 6 sports cars vary by no more than 20 mph.

3) Check for outliers in the data set in number 2.



Formulas are $Q_1 - 1.5(IQR)$ and $Q_3 + 1.5(IQR)$

220, 230, 230, 240, 240, 245, 250, 250, 250, 260, 260, 270

The data from example 2 is Q_1 is 235. Q_3 is 255.
The interquartile range (IQR) is 20.

The outliers are $235 - 1.5(20)$ $255 + 1.5(20)$
 $235 - 30 = 205$ $255 + 30 = 285$

This data has no outliers because there are no speeds less than 205 or greater than 285.