

Measures of Central Tendency

12.1

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Median:	
<u>Mode:</u>	

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Median:	
<u>Mode:</u>	

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Mean:	Average. The sum of a set of data divided by the number of data. (Do not round your answer unless directed to do so.)
Median:	The middle value, or the mean of the middle two values, when the data is arranged in numerical order. Think of a "median" being in the middle of a highway.
<u>Mode:</u>	

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EXAMPLE**1****Finding the Mean, Median, and Mode**

An amusement park hires students for the summer. The students' hourly wages are given in the table. Find the mean, median, and mode of the hourly wages.

Students' Hourly Wages	
\$3.87	\$7.25
\$8.75	\$8.45
\$8.25	\$7.25
\$6.99	\$7.99

Mean

sum of the data

$$\frac{58.8}{8} = 7.35$$

number of values

Median3.87, 6.99, 7.25, **7.25, 7.99**, 8.25, 8.45, 8.75

$$\frac{15.24}{2} = 7.62$$

Mode3.87, 6.99, **7.25, 7.25**, 7.99, 8.25, 8.45, 8.75

7.25

On Your Own

1. **WHAT IF?** In Example 1, the park hires another student at an hourly wage of \$6.99. How does this additional value affect the mean, median, and mode? Explain.

mean: \$7.31, decreases;
median: \$7.25, decreases;
Because the hourly wage
of the student is less than
the mean and median,
both mean and median
decrease. modes: \$6.99
and \$7.25; The data set
now has two modes
instead of one mode.

EXAMPLE**2****Removing an Outlier**

An *outlier* is a data value that is much greater or much less than the other values.

Identify the outlier in Example 1. How does the outlier affect the mean, median, and mode?

The value \$3.87 is low compared to the other wages. It is the outlier.

Find the mean, median, and mode without the outlier.

Mean: $\frac{54.93}{7} \approx 7.85$

Median: 6.99, 7.25, 7.25, **7.99**, 8.25, 8.45, 8.75

Mode: 6.99, **7.25, 7.25**, 7.99, 8.25, 8.45, 8.75

When you remove the outlier, the mean increases $\$7.85 - \$7.35 = \$0.50$, the median increases $\$7.99 - \$7.62 = \$0.37$, and the mode is the same.

EXAMPLE**3****Changing the Values of a Data Set**

In Example 1, each hourly wage increases by \$0.50. How does this increase affect the mean, median and mode?

Make a new table by adding \$0.50 to each hourly wage.

Students' Hourly Wages	
\$4.37	\$7.75
\$9.25	\$8.95
\$8.75	\$7.75
\$7.49	\$8.49

Mean: $\frac{62.8}{8} = \$7.85$

Median: 4.37, 7.49, 7.75, **7.75, 8.49**, 8.75, 8.95, 9.25

$$\frac{16.24}{2} = \$8.12$$

Mode: \$7.75

When each hourly wage increases by \$0.50, the mean, median, and mode all increase by \$0.50.

EXAMPLE**4****Finding a Missing Value****Find the value of x .**Mean is 6; 2, 8, 9, 7, 6, x

$$\frac{32 + x}{6} = 6$$

$$32 + x = 36$$

$$x = 4$$

Median is 14; 9, 10, 12, x , 20, 25

$$\frac{12 + x}{2} = 14$$

$$12 + x = 28$$

$$x = 16$$