Learning Target: I can calculate measures of central tendency - mean, median, mode and spread (range) (interquartile range) from a set of data.

Key Vocabulary:

Mean: average of all values

Median: middle value

Mode: most common value

Range: largest value - smallest value

Find the mean, median, mode, and range from the set of data:

1) 12, 10, 9, 15, 16, 10, 6

Order the numbers from least to greatest:

Mean: \( \frac{78}{7} = 11.1 \)

Median: 10

Mode: 10

Range: 16 - 6 = 10

2) 75, 38, 43, 120, 65, 48, 52, 51

Order the numbers from least to greatest:

Mean: \( \frac{492}{6} = 82 \)

Median: 51.5

Mode: None

Range: 120 - 38 = 82

- How do you find the mean of a data set?
  Add all values
  \[ \frac{\text{number of values}}{\text{all values}} \]

- How do you find the median of a data set?
  Order them and write the middle number.

- How do you find the range of a data set?
  \[ \text{Largest value} - \text{Smallest value} \]
3) Mary ran the 100-meter dash in 5 track meets this season. Her times were 13.2 sec, 12.9 sec, 12.5 sec, 12.8 sec, and 12.1 sec. What was her average time for the 100-meter dash?

\[
\frac{13.2 + 12.9 + 12.5 + 12.8 + 12.1}{5} = \frac{63.5}{5} = 12.7 \text{ sec}
\]

4) During the first 2 weeks that the new Chipotle in Algonquin was open, they served 12,068 customers. If they were open every day for 2 weeks, what was the average number of customers served each day?

\[
\frac{12068}{14} = 862 \text{ customers}
\]

5) The monthly rainfall for a U.S. city for the first ten months is given in the table below.

<table>
<thead>
<tr>
<th>Month</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inches</td>
<td>2.9</td>
<td>2.5</td>
<td>3.3</td>
<td>4.2</td>
<td>4.8</td>
<td>4.1</td>
<td>3.3</td>
<td>3.5</td>
<td>3.1</td>
<td>4.3</td>
</tr>
</tbody>
</table>

a) What is the average monthly rainfall in inches for the city?

\[
\frac{2.9 + 2.5 + 3.3 + 4.2 + 4.8 + 4.1 + 3.3 + 3.5 + 3.1 + 4.3}{10} = 3.4
\]

b) What was the median rainfall in inches over the 10 months?

\[
3.4 \text{ (split 3.3 + 3.5)}
\]

c) What was the mode in inches?

3.3

d) What was the range of rainfall in inches?

\[
4.8 - 2.5 = 2.3
\]

Which would you use? Would you use mean, median, mode, or range for each situation? Explain:

- Jack noticed that half of the cereal brands in the store cost more than $2.00.
  
  \text{Median, half-way value.}

- The average score on the last Pre-Algebra test was 77.
  
  \text{Mean, maybe median.}

- The most common height on the basketball team is 6ft 1 in.

  \text{Mode, many repeated values.}

- The heights of the players on the basketball team vary by 8 inches.

  \text{Range, variance.}
6) Use the given table to calculate the mean, median and mode of completed units.

<table>
<thead>
<tr>
<th>Unit</th>
<th>Percentage</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 1</td>
<td>87%</td>
<td>71</td>
</tr>
<tr>
<td>Unit 2</td>
<td>100%</td>
<td>71</td>
</tr>
<tr>
<td>Unit 3</td>
<td>71%</td>
<td>78</td>
</tr>
<tr>
<td>Unit 4</td>
<td>78%</td>
<td>87</td>
</tr>
<tr>
<td>Unit 5</td>
<td>71%</td>
<td>100</td>
</tr>
<tr>
<td>Unit 6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\text{Mean: } \frac{407}{5} = 81.4
\]

\[
\text{Median: } 78
\]

\[
\text{Mode: } 71
\]

7) Suppose they received a 65% on the Unit 6 test. Calculate the mean, median and mode.

\[
\text{Mean: } \frac{407 + 65}{5 + 1} = 78.67
\]

\[
\text{Median: } 74.5
\]

\[
\text{Mode: } 71
\]

a) How did this affect the mean?

Decreased it.

b) How did this affect the median?

Decreased it.

c) How did this affect the mode?

Not at all.

d) Suppose she received an 89% instead on the Unit 6 Test. How would this affect the mean?

Increase it.

How can we predict how adding a number to a data set affects the mean?

A value larger than the mean increases the value and vice versa.
Making More Predictions!

8) Ryan really wants to get an A (90%) in his math class. So far, he has taken 5 tests with scores of 84, 91, 95, 85, and 89. What score would Ryan have to get on his last unit test to get his average up to a 90%?

\[
\frac{84 + 91 + 95 + 85 + 89 + ?}{5 + 1} = 90
\]

\[
? + 444 = 540
\]

\[
\frac{960}{10}
\]

9) LeBron James has a dream to average 50 points over a 10 game span. In the last 9 games, he has scored 39, 60, 52, 49, 65, 63, 20, 46, and 52 points. How many points would LeBron have to score in his 10th game to make his dream come true?

\[
39 + 60 + 52 + 49 + 65 + 63 + 20 + 46 + 52 = 446
\]

\[
\frac{446 + x}{9 + 1} = 50
\]

\[
446 + x = 500
\]

\[
54 \text{ points}
\]

10) The Lepkowski family is taking a road trip to the Grand Canyon. Mr. Lepkowski wants to get there quickly so he sets a goal to travel an average of 500 miles each day. After two days, the family has driven 996 miles. If they have to drive 1 more day to get there, how many miles do they need to travel to meet Mr. Lepkowski’s goal?

\[
\frac{996 + x}{2 + 1} = 500
\]

\[
996 + x = 1500
\]

\[
504 \text{ miles}
\]

11) A local Salvation Army store keeps track of how many donations they get each month. The goal is that the store will average around 250 donations every month. Through 4 months, the store has received 895 donations. How many donations must they receive in the 5th month to meet their goal?

\[
\frac{895 + x}{4 + 1} = 250
\]

\[
895 + x = 1250
\]

\[
355 \text{ donations}
\]
Learning Target 1: I can calculate measures of central tendency - mean, median, mode and spread (range) (interquartile range) from a set of data.

Find the mean, median, mode, and range for the each of the following sets of data:

1) 12, 15, 17, 28, 30, 27, 16
   \[ \text{Mean: } \frac{145}{7} = 20.71 \]
   \[ \text{Median: } 17 \]
   \[ \text{Mode: None} \]
   \[ \text{Range: } 30 - 12 = 18 \]

2) 22, 54, 87, 12, 30, 72, 13, 49, 80, 72
   \[ \text{Mean: } \frac{501}{10} = 50.1 \]
   \[ \text{Median: } 51.5 \]
   \[ \text{Mode: 72} \]
   \[ \text{Range: } 87 - 12 = 75 \]

3) Over a three-week period, Lauren’s jewelry store sold $15,330 in merchandise.
   a) What is the store’s average sales per week?
      \[ \frac{15330}{3} = \$5110 \text{ average sales per week.} \]
   b) If the store was open every day, what is the store’s average sales per day?
      \[ \frac{15330}{21} = \$730 \text{ average sales per day} \]

4) Julie asked her friends how many hours per week they read for fun. She got the following answers:
   \[ \frac{1}{2}, 7 \text{ hours, } 2 \frac{1}{2} \text{ hours, } \frac{3}{4} \text{ hours, } 12 \text{ hours, } 4 \frac{1}{2} \text{ hours.} \]
   a) What is the range of the number of hours her friends read for fun?
      \[ 12 - 0.5 = 11.5 \text{ hrs} \]
   b) What was the average number of hours her friends read for fun?
      \[ \frac{27}{6} = 4.5 \text{ hrs.} \]
   c) What is the median number of hours her friends read for fun?
      \[ 3.5 \text{ hrs} \]
   d) What is the mode of hours her friends read for fun?
      \[ 0.5 \text{ hrs} \]
5) During a 5-year span, the number of wins achieved by a high school basketball team is shown in the table below:

<table>
<thead>
<tr>
<th>Year</th>
<th>Wins</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>19</td>
</tr>
<tr>
<td>2010</td>
<td>12</td>
</tr>
<tr>
<td>2009</td>
<td>22</td>
</tr>
<tr>
<td>2008</td>
<td>14</td>
</tr>
<tr>
<td>2007</td>
<td>19</td>
</tr>
</tbody>
</table>

a) What was the average number of wins per year over the 5-year span?

\[
\bar{x} = \frac{86}{5} = 17.2 \text{ wins}
\]

b) What is the range in the number of wins the basketball team achieved?

\[22 - 12 = 10 \text{ wins}\]

c) In 2012, they win 19 games. Will this increase or decrease the mean? How do you know?

Increase, \(19 > 17.2\).

6) John’s average test grade is 84%. He wants to raise his average test grade by doing well on the next test. What is the possible range of scores for his next test that would raise his average test grade?

\([89, 105]\) Any score possible that is greater than \(84\%\).

7) Linda has recently started a business. So far, her user ratings (out of 5 stars) are 2, 4, 5, 4, 3, 2, 4, 3, and 5. What is the possible range of user ratings for the next review so that her average rating goes up?

\[\frac{32}{\bar{x}} = 3.56 \quad \text{or} \quad 4 \quad \text{or} \quad 5, \quad \text{no values between.}\]

8) Seth had a rough semester but really wants to pass his math class(60%). So far, he has taken 5 tests with scores of 64, 51, 45, 44, and 68. What score would Seth have to get on his last unit test to get his average up to a 60%?

\[
\frac{64 + 51 + 45 + 44 + 68 + x}{6} = 60
\]

\[
\frac{272 + x}{5 + 1} = 60
\]

\[272 + x = 360\]

\[x = 88\]