12-3

Analyzing Data

**Objective:** Calculate measures of central tendency.
Warm-up

Order each set of values from least to greatest. Then find the middle value.

1. 0.2  0.3  0.6  1.2  0.7  0.9  0.8
   \[0.2, 0.3, 0.6, 0.7, 0.8, 0.9, 1.2\]

2. 7.8  2.6  3.9  15.6  9.1  11.7  10.4
   \[2.6, 3.9, 7.8, 9.1, 10.4, 11.7, 15.6\]

3. What is the name of the middle value?
   \[\text{median}\]
Vocabulary Review

**Mean**: The average. The sum of the values divided by the number of values. \( \bar{x} \)

**Median**: The middle value of a data set in numerical order.

**Mode**: The most frequently occurring value. There can be more than one mode or no mode. A *bimodal* data set has two modes.

**Range**: The difference between the maximum and minimum values.

**Quartile**: Values that separate data into 4 equal parts. The second quartile, \( Q_2 \), is the median. The first and third quartiles \( (Q_1 \text{ and } Q_3) \) are the medians of the lower half and upper half of the data.

**Interquartile Range**: The difference between the third and first quartiles. \( (Q_3 - Q_1) \)

**Outlier**: A data value that is substantially different from the other values in a data set.
Example #1: Consider the following test scores. Find the following:

89, 73, 84, 62, 87, 77, 94, 67, 91, 80, 98, 78, 60, 75, 83

Mean: \[ \frac{1111}{15} = 74.06 \]

Median: 80

Mode: no mode

Range: 98 - 60 = 38

Quartiles: 

\[ Q_1 = \frac{73 + 75}{2} = 74 \]
\[ Q_2 = 80 \]
\[ Q_3 = 88 \]

Interquartile Range: 

\[ Q_3 - Q_1 = 4 \]

Outlier: none
Example #2: Consider the following test scores. Find the following:

60, 62, 67, 73, 75, 77, 78, 80, 83, 84, 87, 89, 91, 94, 98

Mean:

Median:

Mode:

Range:

Quartiles:

Interquartile Range:

Outlier:
Example #3: Consider the following data. Find the following:

Major Earthquakes Worldwide (Magnitude 7.0 and Greater)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Earthquakes</td>
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<td>23</td>
<td>16</td>
<td>15</td>
<td>25</td>
<td>22</td>
<td>20</td>
<td>16</td>
<td>23</td>
<td>18</td>
</tr>
</tbody>
</table>

SOURCE: U.S. Geological Survey National Earthquake Information Center

11, 15, 16, 16, 18, 20, 22, 23, 23, 25

Mean:

Median:

Mode:

Range:

Quartiles:

Interquartile Range:

Outlier:
Homework
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