Name ________________________________

Effects of Outliers

An outlier is a value in a data set that is very different from the other values in the data set. An outlier can affect the mean, median, and range of a data set.

Hal priced blow dryers. The prices are shown below. 

$19  $20  $20  $21  $100

Most of the data is clustered around $20. The outlier is $100 because it is very different from the other values in the data set.

Find the mean, median, mode, and range of the data with and without the outlier.

<table>
<thead>
<tr>
<th></th>
<th>With Outlier</th>
<th>Without Outlier</th>
<th>Effect of Outlier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>(19 + 20 + 20 + 21 + 100) ÷ 5 = 36 Mean is $36.</td>
<td>(19 + 20 + 20 + 21) ÷ 4 = 20 Mean is $20.</td>
<td>Higher/Increase.</td>
</tr>
<tr>
<td>Median</td>
<td>19  20  20 21 100 Median is $20.</td>
<td>19  20  20 21 Median is $20.</td>
<td>No change.</td>
</tr>
<tr>
<td>Mode</td>
<td>$20</td>
<td>$20</td>
<td>No change.</td>
</tr>
<tr>
<td>Range</td>
<td>100 – 19 = 81 The range is $81.</td>
<td>21 – 19 = 2 The range is $2.</td>
<td>Higher/Increase.</td>
</tr>
</tbody>
</table>

For this data set, the effect of the outlier is to increase the mean and the range. There is no effect on the median or on the mode.

Use this data set to find the effects of outliers. Two measures will need to be written with tenths. 

30, 29, 7, 29, 32

1. What is the outlier? _________

2. Find the mean, median, mode, and range of the data with the outlier.

Mean _________  Median _________  Mode _________  Range _________

3. Find the mean, median, mode, and range of the data without the outlier.

Mean _________  Median _________  Mode _________  Range _________

4. Writing to Explain  What is the effect of the outlier on this data set?

__________________________________________________________________________

5. Change the outlier in the data set to 100. The new data set still has five numbers, but the outlier is different. Write the new data set. Find the mean, median, mode, and range with the new outlier.

__________________________________________________________________________