Statistics 1 Quiz 3 Due: 

Hand your completed quiz in before the due date. Do not forget to write down your name and student ID number. Marks will be awarded for this quiz based on the clarity of your answers. The marker will pay close attention to the logic of your answers. Please show all your working.

Q.1 Consider the sample 100, 37, 12, 20, 53, 10, 20, 50, 35, 30.

(a) Find the mean \( \bar{x} \).

(b) Find the median \( \tilde{x} \).

(c) Find the range of the data.

(d) Remove the most extreme value and answer (a) (b) (c) again.

(e) Did removing the extreme value have more of an effect on the mean or median?

(f) Do the same with Excel. (Use Descriptive Statistics inside Data Analysis.)

Q.2 Consider the sample 2, 4, 7, 8, 9.

(a) Find the variance \( s^2 \) of the data.

(b) Find the standard deviation \( s \) of the data.

(c) Do the same with Excel. (Use Descriptive Statistics inside Data Analysis.)

Q.3 Fifteen randomly selected college students were asked to state the number of hours they slept the previous night. The resulting data are 5, 6, 6, 8, 7, 7, 9, 5, 4, 8, 11, 6, 7, 8, 7.

(a) Find the variance \( s^2 \) of the data. (Use the easier formula.)

(b) Find the standard deviation \( s \) of the data.

(c) Do the same with Excel. (Use the Excel function STDEV and Descriptive Statistics inside Data Analysis. Make sure that both results agree. You do not need to submit the output.)

Q.4 Consider the following two sets of data.

<table>
<thead>
<tr>
<th></th>
<th>45</th>
<th>80</th>
<th>50</th>
<th>45</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set2</td>
<td>30</td>
<td>80</td>
<td>35</td>
<td>30</td>
<td>75</td>
</tr>
</tbody>
</table>

Both sets have the same mean (you can check), which is 50.

(a) Compute \( \Sigma(x - \bar{x}) \) and \( SS(x) = \Sigma(x - \bar{x})^2 \) (the sum of squares) for both sets.

(b) Compute the standard deviation \( s \) for both sets. (Use Excel if you like.)

(c) Comment on the meaning of these computations relative to the distribution. (Which data set is more spread than the other?)

Q.5 The U.S Geological Survey collected atmospheric deposition data in the Rocky Mountains. Part of the sampling process was to determine the concentration of ammonium (in percentages). Here are the results from 40 samples.
(a) Find $Q_1$.
(b) Find $Q_2$.
(c) Find $Q_3$.
(d) Find $P_{10}$ (The 10-th percentile).
(e) Draw the box-and-whisker display.

Q.6 An exam produced grades with a mean score of 74.2 and a standard deviation of 11.5. Find the z-score for each test score $x$:

(a) $x = 54$.
(b) $x = 68$.
(c) $x = 79$.
(d) $x = 93$.

Q.7 Using the empirical rule, determine the approximate percentage of a normal distribution that is expected to fall within the interval described.

(a) Less than the mean.
(b) Greater than 1 standard deviation above the mean.
(c) Less than 1 standard deviation above the mean.
(d) Between 1 standard deviation below the mean and 2 standard deviations above the mean.