

Name:

## Continuous Random Variables: Continuous Distribution Lab

**Collect the Data:** Use a random number generator to generate 50 values between 0 and 1 (inclusive). List them below. Round the numbers to 4 decimal places or set the calculator MODE to 4 places.

Complete the table


Make a frequency table for the data for the whole class:

Classes	Frequency	Relative Frequency
.0000 - .1999		
.2000 - .3999		
.4000 - .5999		
.6000 - .7999		
.8000 - .9999		

Calculate the following:  $\bar{x}$  = \_\_\_\_\_  $s$  = \_\_\_\_\_

1<sup>st</sup> quartile = \_\_\_\_\_ 3rd quartile = \_\_\_\_\_ median = \_\_\_\_\_

Construct a histogram of the empirical data. Make 5 bars.

**Describe the Data:** Describe the shape of each graph. Use 2 – 3 complete sentences. (Keep it simple. Does the graph go straight across, does it have a V shape, does it have a hump in the middle or at either end, etc.? One way to help you determine a shape, is to roughly draw a smooth curve through the top of the bars.)

## Theoretical Distribution

In words,  $X =$

The theoretical distribution of  $X$  is  $X \sim U(0, 1)$ . In theory, based upon the distribution  $X \sim U(0, 1)$ , find

$\mu =$  \_\_\_\_\_                       $\sigma =$  \_\_\_\_\_

1<sup>st</sup> quartile = \_\_\_\_\_              3rd quartile = \_\_\_\_\_              median = \_\_\_\_\_

Are the empirical values close to the corresponding theoretical values in “Theoretical Distribution” above? Why or why not?

## Plot the Data

Construct a box plot of the data.

Do you notice any potential outliers? If so, which values are they? Either way, numerically justify your answer. (Recall that any DATA are less than  $Q1 - 1.5 \cdot IQR$  or more than  $Q3 + 1.5 \cdot IQR$  are potential outliers. IQR means interquartile range.)

## Compare the Data

For each part below, use a complete sentence to comment on **how** the value obtained from the data compares to the theoretical value you expected from the distribution  $X \sim U(0, 1)$ .

minimum value:

third quartile:

1<sup>st</sup> quartile:

maximum value:

median:

width of IQR:

overall shape:

Based on your above comments, how does the box plot fit or not fit **what you would expect** of the distribution  $X \sim U(0, 1)$ ?

**Discussion Question:** Suppose that the number of values generated was 500, not 50. How would that affect what you would expect the empirical data to be and the shape of its graph to look like?