Normal Distribution: Normal Distribution Lab I*

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Class Time:
Names:

1 Student Learning Outcome:

- The student will compare and contrast empirical data and a theoretical distribution to determine if Terry Vogel's lap times fit a continuous distribution.

2 Directions:

Round the relative frequencies and probabilities to 4 decimal places. Carry all other decimal answers to 2 places.

3 Collect the Data

1. Use the data from Terri Vogel's Log Book[1]. Use a Stratified Sampling Method by Lap (Races 1 – 20) and a random number generator to pick 6 lap times from each stratum. Record the lap times below for Laps 2 – 7.

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

Table 1

*Version 1.18: Nov 8, 2009 6:12 pm -0600
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[1]"Collaborative Statistics: Data Sets": Section Lap Times <http://cnx.org/content/m17132/latest/#element-244>

2. Construct a histogram. Make 5 - 6 intervals. Sketch the graph using a ruler and pencil. Scale the axes.

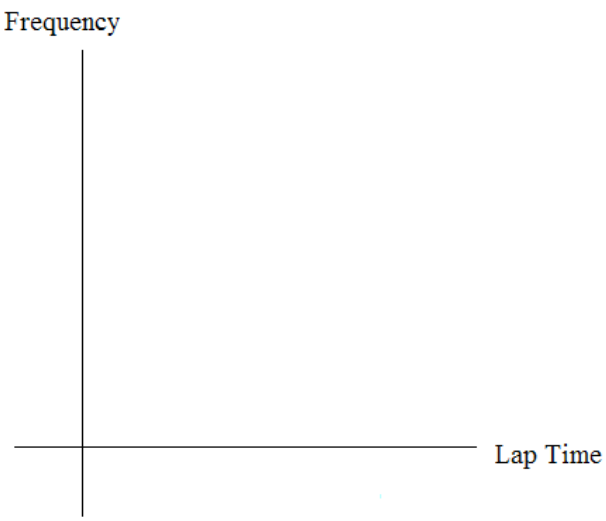

Figure 1

3. Calculate the following.

   a. $\overline{x} =$
   b. $s =$

4. Draw a smooth curve through the tops of the bars of the histogram. Use $1 - 2$ complete sentences to describe the general shape of the curve. (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.?)

4 Analyze the Distribution

Using your sample mean, sample standard deviation, and histogram to help, what was the approximate theoretical distribution of the data?

- $X \sim$
- How does the histogram help you arrive at the approximate distribution?

5 Describe the Data

Use the Data from the section titled "Collect the Data" to complete the following statements.

- The IQR goes from _____ to _____.
- IQR = _____. (IQR=Q3-Q1)
- The 15th percentile is:

- The 85th percentile is:
- The median is:
- The empirical probability that a randomly chosen lap time is more than 130 seconds =
- Explain the meaning of the 85th percentile of this data.

6 Theoretical Distribution

Using the theoretical distribution from the section titled "Analyse the Distribution" complete the following statements:

- The IQR goes from _____ to _____.
- IQR =
- The 15th percentile is:
- The 85th percentile is:
- The median is:
- The probability that a randomly chosen lap time is more than 130 seconds =
- Explain the meaning of the 85th percentile of this distribution.

7 Discussion Questions

- Do the data from the section titled "Collect the Data" give a close approximation to the theoretical distibution in the section titled "Analyze the Distribution"? In complete sentences and comparing the result in the sections titled "Describe the Data" and "Theoretical Distribution", explain why or why not.