

## 4.5: Normal Distribution - Pinkie Length (Worksheet)

Name: \_\_\_\_\_

Section: \_\_\_\_\_

Student ID#: \_\_\_\_\_

*Work in groups on these problems. You should try to answer the questions without referring to your textbook. If you get stuck, try asking another group for help.*

### Student Learning Outcomes

- The student will compare empirical data and a theoretical distribution to determine if data from the experiment follow a continuous distribution.

### Collect the Data

Measure the length of your pinky finger (in centimeters).

- Randomly survey 30 adults for their pinky finger lengths. Round the lengths to the nearest 0.5 cm.

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

- Construct a histogram. Make five to six intervals. Sketch the graph using a ruler and pencil. Scale the axes.

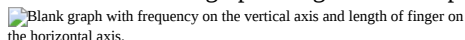
Blank graph with frequency on the vertical axis and length of finger on the horizontal axis.

Figure 6.5.1.

- Calculate the following.

a.  $\bar{x}$  = \_\_\_\_\_

b.  $s$  = \_\_\_\_\_

- Draw a smooth curve through the top of the bars of the histogram. Write one to two 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, and so on?)

### Analyze the Distribution

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

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

### Describe the Data

Using the data you collected complete the following statements. (Hint: order the data)

REMEMBER

$$(IQR = Q_3 - Q_1)$$

- $IQR$  = \_\_\_\_\_
- The 15<sup>th</sup> percentile is \_\_\_\_\_.
- The 85<sup>th</sup> percentile is \_\_\_\_\_.

- Median is \_\_\_\_\_.
- What is the theoretical probability that a randomly chosen pinky length is more than 6.5 cm?
- Explain the meaning of the 85<sup>th</sup> percentile of this data.

### Theoretical Distribution

Using the theoretical distribution, complete the following statements. Use a normal approximation based on the sample mean and standard deviation.

- $IQR =$  \_\_\_\_\_
- The 15<sup>th</sup> percentile is \_\_\_\_\_.
- The 85<sup>th</sup> percentile is \_\_\_\_\_.
- Median is \_\_\_\_\_.
- What is the theoretical probability that a randomly chosen pinky length is more than 6.5 cm?
- Explain the meaning of the 85<sup>th</sup> percentile of this data.

### Discussion Questions

Do the data you collected give a close approximation to the theoretical distribution? In complete sentences and comparing the results in the sections titled [Describe the Data](#) and [Theoretical Distribution](#), explain why or why not.

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