

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

## WISE Central Limit Theorem Tutorial

### Follow-up Questions

1. Suppose we have a report that the height for male students at Apex College is approximately normally distributed with a mean of 6 feet (72 inches) and a standard deviation of 2 inches. Based on this survey, approximately what proportion of Apex men are 5'8" (68 inches) or shorter?

2. Your friend Bumble wishes to know if men at his college are 72 inches tall, on average, like Apex College men. He randomly sampled 10 men on his campus, measured their height, and calculated the sample mean to be 69 inches. He concluded that men at his college do not differ in height from Apex men, because 69 inches is only 1.5 standard deviations less than 72 inches and this is not a statistically significant difference. Evaluate his procedure and conclusion.

3. Still thinking about the height of men at Apex College (mean=72 inches and  $SD=2$  inches), try ordering the likelihood of the following instances from the most likely to the least likely.

- a. You select one Apex man at random and (to the nearest inch) he is 6'4" (76 inches) tall.
- b. You select one Apex man at random and (to the nearest inch) he is 6'2" (74 inches) tall.
- c. You select a random sample of 5 Apex men and the mean of their heights is (to the nearest inch) 6' (72 inches).

\_\_\_\_\_ most likely    \_\_\_\_\_ next most likely    \_\_\_\_\_ least likely

Explain your reasoning.

4. Suppose we draw random samples of men from Apex College. Recall that the mean height of Apex men is 6 feet (72 inches) with a standard deviation of 2 inches. How likely is each of the following:

A sample of  $n = 4$  has a mean greater than 73 inches.  $p = \underline{\hspace{2cm}}$

A sample of  $n = 25$  has a mean greater than 73 inches.  $p = \underline{\hspace{2cm}}$

A sample of  $n = 100$  has a mean greater than 73 inches.  $p = \underline{\hspace{2cm}}$

5. Under what circumstances might the sampling distribution of the mean not be normal in shape? Consider the shape of the population, the size of the sample, and the randomness of the sample.

6. Why are the facts summarized in the Central Limit Theorem considered to be so important for inferential statistics? Consider the mean, standard error, and shape of the sampling distribution of the means in your answer.