Confidence Interval of a population mean

Name _____

Date _____ HW #____

Statistics Spring 2017

Error: $E = \dfrac{z*\sigma_x}{\sqrt{n}}$

95%

-1.96   0   1.96
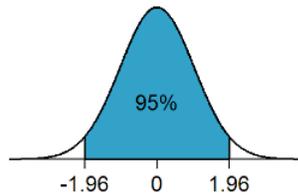
Population: $n = \left(\dfrac{z*\sigma}{m}\right)^2$

"For help, refer to the Notes I gave you on the first day of the unit."

1. A random sample of 100 students is selected from a certain school. They are given an IQ test which has a known standard deviation of 11. The sample mean is found to be 112. Determine a 98% confidence interval for estimating the mean school intelligence.

2. A survey of hospital records of 35 randomly selected patients suffering from a particular disease indicated that the average hospital stay was 10 days with a standard deviation of 2.1 days. Find a 99% confidence interval and interpret what it means.

3. Suppose an archeologist discovers 6 fossil skeletons from a previously unknown species of miniature horse. Reconstruction of the skeletons allows her to measure their shoulder height (in centimeters) of the horses. The heights are 45.3, 47.1, 44.2, 46.8, 45.5, and 47.6. From this data construct a 95% confidence interval for the mean shoulder height of this species of miniature horses.

4. A set of animals is fed a certain type of grain for a ten-week period to estimate average weight gain. What sample size is needed if you want the estimate to be within 1.5 pounds of the correct μ with 95% confidence? Past experience indicates that the standard deviation is 7 pounds.

5. Determine the sample size needed to estimate the average weight of all second-grade boys if we want to be within 1 pound with 95% confidence. Assume we know that the standard deviation of such weights is 3 pounds.

6. Find the sample size needed to estimate the population mean to within 1/5 of a standard deviation with 99% confidence.

7. A chicken farmer has 1000 chickens. She wishes to experiment with a new diet to improve weight gain. She estimates the standard deviation by weighing 20 chickens (as a pre-sample) and finds that σ = 4 ounces per chicken. How large a sample should she take so that her estimate of the total weight gain for all 1000 chickens, if placed on this diet, will, with 95% confidence, not be in error by more than 40 pounds?

8. The birth process of a newly discovered mammal is being studied, and the lengths of 18 observed pregnancies have been recorded. The mean gestation period was 97.3 days with s = 2.2 days. Find a 95% confidence interval for the mean time of pregnancy for this mammal.

9. Consumer Reports is conducting independent tests to determine the distance a certain car will travel while consuming only 1 gallon of gas. A sample of 9 cars is tested and an average of 28.2 miles is obtained. Assuming that s = 2.7 miles, find a 98% confidence interval for the mean distance for all cars of this type using 1 gallon of gas.

10. A forester wishes to estimate M. the mean growth of seedlings in a large timber plot since last year. A random sample of 100 seedlings is taken and it is found that the one-year growth yields an average of 12.8 cm and s = 2.5 cm. Give a 95% confidence interval estimate for μ, the average growth of all seedlings in the plot.

11. A large bakery wishes to estimate its average consumption of flour each day. Usage is sampled over 10 days and it is found that there is a daily average usage of 11,400 pounds with s = 700 pounds. Give an interval estimate with 98% confidence.

12. For their total production of light bulbs, the management of an electronics firm knows that σ = 150. How large a sample is needed if they want to be 90% confident that the estimate will be within 30 hours of the correct value?