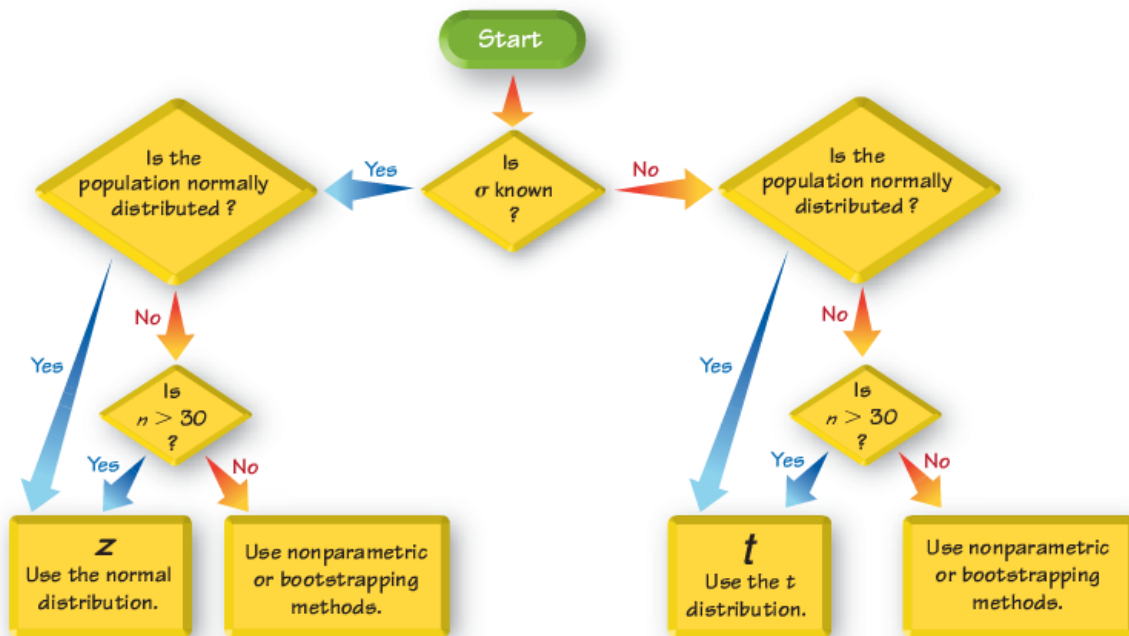


Confidence Intervals for Sample Means (δ not known)



Which Method?

- $n = 9$, $\bar{x} = 75$, $s = 15$, and the population has a normal distribution.
- $n = 5$, $\bar{x} = 20$, $s = 2$, and the population has a very skewed distribution.
- $n = 12$, $\bar{x} = 98.6$, $\sigma = 0.6$, and the population has a normal distribution. (In reality, σ is rarely known.)
- $n = 75$, $\bar{x} = 98.6$, $\sigma = 0.6$, and the population has a skewed distribution. (In reality, σ is rarely known.)
- $n = 75$, $\bar{x} = 98.6$, $s = 0.6$, and the population has a skewed distribution.

Confidence Intervals for Sample Means (δ not known)

18. Birth Weights A random sample of the birth weights of 186 babies has a mean of 3103 g and a standard deviation of 696 g (based on data from “Cognitive Outcomes of Preschool Children with Prenatal Cocaine Exposure,” by Singer et al., *Journal of the American Medical Association*, Vol. 291, No. 20). These babies were born to mothers who did not use cocaine during their pregnancies.

- a. What is the best point estimate of the mean weight of babies born to mothers who did not use cocaine during their pregnancies?
- b. Construct a 95% confidence interval estimate of the mean birth weight for all such babies.
- c. Compare the confidence interval from part (b) to this confidence interval obtained from birth weights of babies born to mothers who used cocaine during pregnancy: $2608 \text{ g} < \mu < 2792 \text{ g}$. Does cocaine use appear to affect the birth weight of a baby?

Sample mean _____

Sample size _____

Degrees of freedom (n-1) _____

Margin of error:

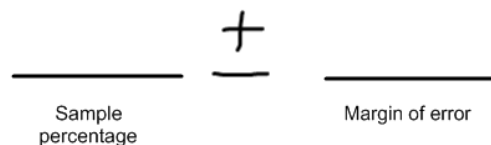
Standard deviation:

Critical value of t*

Margin of error:

$$t^* \frac{s}{\sqrt{n}} \quad () \quad \sqrt{\quad}$$

Confidence Interval:



Confidence Statement

We are ____% confident the true mean _____
 is between _____ to _____.

Confidence Intervals for Sample Means (δ not known)

20. Atkins Weight Loss Program In a test of the Atkins weight loss program, 40 individuals participated in a randomized trial with overweight adults. After 12 months, the mean weight *loss* was found to be 2.1 lb, with a standard deviation of 4.8 lb.

- a. What is the best point estimate of the mean weight loss of all overweight adults who follow the Atkins program?
- b. Construct a 99% confidence interval estimate of the mean weight loss for all such subjects.
- c. Does the Atkins program appear to be effective? Is it practical?

Sample mean _____

Sample size _____

Degrees of freedom (n-1) _____

Margin of error:

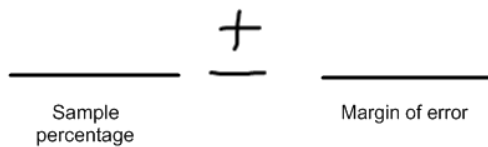
Standard deviation:

Critical value of t*

Margin of error:

$$T^* \frac{s}{\sqrt{n}} \quad () \sqrt{\quad}$$

Confidence Interval:



Confidence Statement

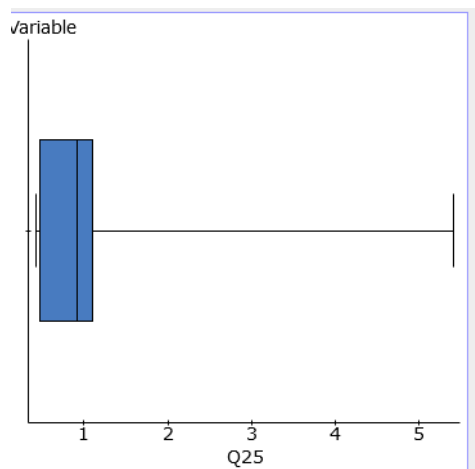
We are _____% confident the true mean _____

is between _____ to _____.

Confidence Intervals for Sample Means (δ not known)

25. Monitoring Lead in Air Listed below are measured amounts of lead (in micrograms per cubic meter, or $\mu\text{g}/\text{m}^3$) in the air. The Environmental Protection Agency (EPA) has established an air quality standard for lead of $1.5 \mu\text{g}/\text{m}^3$. The measurements shown below were recorded at Building 5 of the World Trade Center site on different days immediately following the destruction caused by the terrorist attacks of September 11, 2001. After the collapse of the two World Trade Center buildings, there was considerable concern about the quality of the air. Use the given values to construct a 95% confidence interval estimate of the mean amount of lead in the air. Is there anything about this data set suggesting that the confidence interval might not be very good? Explain.

5.40 1.10 0.42 0.73 0.48 1.10



Confidence Intervals for Sample Means (δ not known)

Issues and Cautions

30. Ages of Presidents Listed below are the ages of the Presidents of the United States at the times of their inaugurations. Construct a 99% confidence interval estimate of the mean age of presidents at the times of their inaugurations. What is the population? Does the confidence interval provide a good estimate of the population mean? Why or why not?

42 43 46 46 47 48 49 49 50 51 51 51 51 51 52 52 54 54 54 54 54 55
55 55 55 56 56 56 57 57 57 57 58 60 61 61 61 62 64 64 65 68 69