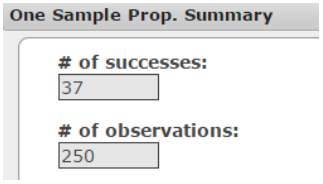
9.3 Putting it together. Which Method? MATH 241 THOMPSON

1) A simple random sample of size n = 250 individuals who are currently employed is asked if they work at home at least once per week. Of the 250 employed individuals surveyed, 37 responded that they did work at home at least once per week. Construct a 99% confidence interval for the population proportion of employed individuals who work at home at least once per week.

The lower bound is .090. (Round to three decimal places as needed.)

The upper bound is .206. (Round to three decimal places as needed.)

STATS – PROPORTION STATS – ONE SAMPLE-WITH SUMMARY



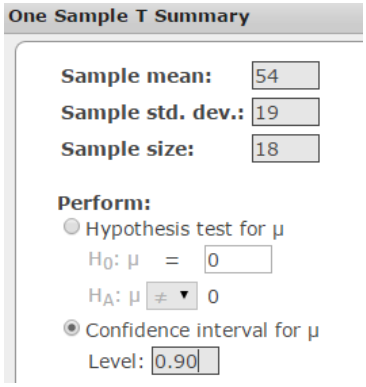
L. Limit	U. Limit
0.09015075	0.20584925

Confidence Level: 0.99

2) A simple random sample of size n = 18 is drawn from a population that is normally distributed. The sample mean is found to be $\bar{x}$ = 54 and the sample standard deviation is found to be s = 19. Construct a 90% confidence interval about the population mean.

The 90% confidence interval is (46.21, 61.79). (Round to two decimal places as needed.)

STATS – T STATS – ONE SAMPLE-WITH SUMMARY



USE T-STATS WHEN HAVE MEAN AND SD

3) A simple random sample of size n = 40 is drawn from a population. The sample mean is found to be $\bar{x}$ = 121.4 and the sample standard deviation is found to be s = 12.1. Construct a 99% confidence interval for the population mean.

The lower bound is 116.22. (Round to two decimal places as needed.)

The upper bound is 126.58. (Round to two decimal places as needed.)

STATS – T STATS – ONE SAMPLE-WITH SUMMARY

4) In a random sample of 38 criminals convicted of a certain crime, it was determined that the mean length of sentencing was 56 months, with a standard deviation of 9 months. Construct and interpret a 95% confidence interval for the mean length of sentencing for this crime.
Click here to view the standard normal distribution table (page 1).
Click here to view the standard normal distribution table (page 2).
Click here to view the table of critical t-values.

STATS – T STATS – ONE SAMPLE-WITH SUMMARY

A. 95% of the sentences for the crime are between ____ and ____ months.

B. We can be 95% confident that the mean length of sentencing for the crime is between 53 and 59 months.

5) In a random sample of 100 audited estate tax returns, it was determined that the mean amount of additional tax owed was $3496 with a standard deviation of $2584. Construct and interpret a 90% confidence interval for the mean additional amount of tax owed for estate tax returns.

STATS – T STATS – ONE SAMPLE-WITH SUMMARY

Click the icon to view the t-distribution table.

The lower bound is $ 3067 . (Round to the nearest dollar as needed.)

The upper bound is $ 3925 . (Round to the nearest dollar as needed.)

Interpret a 90% confidence interval for the mean additional amount of tax owed for estate tax returns. Choose the correct answer below.

A. One can be 90% confident that the mean additional tax owed is between the lower and upper bounds.

6) In a survey of 1008 adults, a polling agency asked, "When you retire, do you think you will have enough money to live comfortably or not. Of the 1008 surveyed, 528 stated that they were worried about having enough money to live comfortably in retirement. Construct a 90% confidence interval for the proportion of adults who are worried about having enough money to live comfortably in retirement.

Click here to view the standard normal distribution table (page 1).
Click here to view the standard normal distribution table (page 2).
Click here to view the table of critical t-values.
Click here to view the table of critical values of the chi-square distribution.

STATS – PROPORTION STATS – ONE SAMPLE-WITH SUMMARY

(Use ascending order. Round to three decimal places as needed.)

A. There is a 90% probability that the true proportion of worried adults is between ___ and ___.

B. There is 90% confidence that the true proportion of worried adults is between .498 and .550.

7) A baseball pitcher's most popular pitch is a four-seam fastball. The data below represent the pitch speed (in miles per hour) for a random sample of 15 of his four-seam fastball pitches.

85.2	86.6	91.4	90.9	88.7
92.9	86.8	93.2	89.6	91.2
85.3	93.5	85.6	87.8	90.4

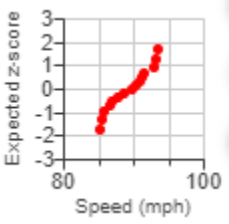
Complete parts (a) through (f) below.

(a) Is "pitch speed" a quantitative or qualitative variable? Why is it important to know this when determining the type of confidence interval you may construct?

The variable "pitch speed" is a quantitative variable. This is important to know because confidence intervals for a mean are constructed on quantitative data while confidence intervals for a proportion are constructed on qualitative data with two possible outcomes.

(b) Draw a normal probability plot to verify that "pitch speed" could come from a population that is normally distributed.

Which normal probability plot below represents the data?



(c) Draw a boxplot to verify the data set has no outliers.

Which boxplot below represents the data?

Since the absolute value of the correlation ….. STATS – GRAPH – QQ PLOT – CHECK show correlation

Shows at the top of the graph. Then us critical value for n = 15 0.514…exceeds and IS

(d) Are the requirements for constructing a confidence interval for the mean pitch speed of the pitcher's four-seam fastball satisfied?

An interval can be constructed because the data are approximately normal and there are no outliers.

(e) Construct and interpret a 95% confidence interval for the mean pitch speed of the pitcher's four-seam fastball.

Select the correct choice below and, if necessary, fill in the answer boxes to complete your choice.

T-STATS-ONE SAMPLE WITH DATA

A. The 95% confidence interval is (87.65, 90.90).
(Round to two decimal places as needed.)

(f) Do you believe that a 95% confidence interval for the mean pitch speed of four-seam fastballs for all pitchers in a league would be narrower or wider? Why?

The interval for all pitchers in a league would be wider because the variability between pitchers is most likely greater than the variability between pitches for a pitcher.

8) A trade magazine routinely checks the drive-through service times of fast-food restaurants. A 95% confidence interval that results from examining 695 customers in one fast-food chain's drive-through has a lower bound of 165.1 seconds and an upper bound of 168.7 seconds. What does this mean?

Choose the correct answer below.

A. The mean drive-through service time of this fast-food chain is 166.9 seconds 95% of the time.
B. One can be 95% confident that the mean drive-through service time of this fast-food chain is 166.9 seconds.
C. One can be 95% confident that the mean drive-through service time of this fast-food chain is between 165.1 seconds and 168.7 seconds.

9) For the following, indicate whether a confidence interval for a proportion or mean should be constructed to estimate the variable of interest. Justify your response.

Researchers within an organization asked a random sample of 1016 adults aged 21 years or older, "Right now, do you think the state of moral values in the country as a whole is getting better, or getting worse?"

The confidence interval for a proportion should be constructed because the variable of interest is an individual's opinion, which is a qualitative variable.

10) For the following, indicate whether a confidence interval for a proportion or mean should be constructed to estimate the variable of interest. Justify your response.

Does chewing your food for a longer period of time reduce one's caloric intake of food at dinner? A researcher requires a sample of 75 healthy males to chew their food twice as long as they normally do. The researcher then records the calorie consumption at dinner.

The confidence interval for a mean should be constructed because the variable of interest is an individual's reduction in caloric intake, which is a quantitative variable.