

Questions on lesson 2.4?

We will be having our concept mastery quiz shortly.

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3. The Reporter newspaper published a survey of 90 residents and 38 stated that they are in favor of the tax increase. Use a 95% confidence interval to determine a range of values for the population proportion. Explain your work.

$$\hat{p} = \frac{38}{90} \approx 0.42 = 42\%$$

standard dev:
$$\sqrt{\frac{0.42(1-0.42)}{90}} \approx 0.052 = 5.2\%$$

$$\rightarrow 42\% \pm 2(5.2\%) \rightarrow \text{margin of error}$$

$$\star \text{The } 95\% \text{ C.I. } 31.6\% \text{ to } 52.4\% \star$$

two confidence intervals overlap, then the difference between the population proportions or population means is not statistically significant. If the intervals do not overlap then the difference between the population proportions or population means is statistically significant.

4. Compare the population proportion estimates and determine whether their differences

Suppose that the mean difference in blood pressure of the group who took the supplement was -15 with a standard deviation of 3.2, and the mean difference in blood pressure of the group who took the placebo was 1.7 with a standard deviation of 0.3.

$$\frac{s}{\sqrt{n}} \rightarrow \frac{3.2}{\sqrt{100}} = 0.32 \text{ standard dev.}$$

4. Use a 95% confidence interval to determine a range of values for the population mean of each treatment. Explain your work.

$$\rightarrow -15 \pm 2(0.32) \leftarrow \begin{matrix} -15 - 2(0.32) \\ -15 + 2(0.32) \end{matrix}$$

* -15.64 to -14.36 is the 95% C.I. *

Content Mastery Quiz - lesson 2.3 and 2.4

Show ALL work to receive full points

Determine a range of values for each population proportion. Use a 95% confidence interval.

435

A survey of 500 schools reports that 87% lock all their doors after the first bell.

$$\frac{s}{\sqrt{n}}$$

$$\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

FROM LESSON 2.4 - NOT IN YOUR BOOK

1. Legislators have been trying to increase public support for the construction of a new bridge in their state's largest city through a broad advertising campaign. Prior to the advertising campaign, 539 out of 1400 people that were polled said they supported the bridge project. Following the advertising campaign, 561 out of 1100 people that were polled said they supported the project.
 - a. Determine the sample proportion of people who support the new bridge for each poll.

 - b. Determine whether the results of the 2 polls are statistically significant. Use a 95% confidence interval when making your calculations.

 - c. Based on your findings in part (b), what can you conclude about the impact of the ad campaign?

FROM LESSON 2.4 - NOT IN YOUR BOOK

2. A random sample of 150 qualifying speeds was collected from data on stock car races. The mean qualifying speed was 191.8 miles per hour with a standard deviation of 2.1 miles per hour.
- Determine a range of values for the population mean using a 95% confidence interval.
 - Burn Rubber Tires introduces a new tire they claim is revolutionary. They guarantee these tires will increase the speeds of stock cars. A random sample of 150 qualifying speeds of cars using these new tires is collected. The average qualifying speed of cars with these tires is 192.08 miles per hour. Are the results of the sample using the new tires statistically significant? What can you conclude about the effectiveness of the new tires? Explain your reasoning.
3. On average, 48% of all babies born in the United States are girls. In the past year, 473 of the 860 babies born in one particular county were girls. Determine whether the birth rate for girls in this county is statistically significant. Use a 95% confidence interval when making your calculations.

DIY

Designing a Study and Analyzing
the Results

2.5

NOT IN YOUR BOOK

1. U.S. high school juniors who took the ACT last year were asked to check a box in the answer booklet stating whether they had completed an ACT prep course prior to taking the exam. To determine whether a prep course improved ACT scores, researchers collected a random sample of ACT test scores from 1500 U.S. high school juniors who completed a prep course prior to taking the ACT exam. They also collected a random sample of ACT test scores from 1500 U.S. high school juniors who did not complete a prep course prior to taking the ACT exam. Those who completed the prep course had a mean score of 22.1 with a standard deviation of 3.9. Those who did not complete the prep course had a mean score of 21.3 with a standard deviation of 4.3.
- Identify the samples and the population.
 - Identify the characteristic of interest.
 - Are the researchers conducting a sample survey, an observational study, or an experiment? Explain your reasoning.
 - Determine the standard deviation for both population means. $\frac{s}{\sqrt{n}}$
 - Determine a 95% confidence interval for both population means.
 - Is the difference between the 2 population means statistically significant? Explain your reasoning.
 - What can you conclude about the effectiveness of the ACT prep course? Discuss the effect of any potential bias on the results.

PG.102 IN YOUR BOOK

Use the following guidelines to design and conduct a sample survey, observational study, or experiment, summarize and analyze the data, and draw conclusions. You can use this page as a checklist while planning and conducting your study.

15 mins.

I. Design a sample survey, observational study, or experiment.	
• Select a characteristic of interest to learn about from a sample survey, observational study, or experiment.	
• Select a question that can be answered by collecting quantitative data.	
• Identify the population.	
• Identify the characteristic being studied.	
• Describe the method for choosing a random sample.	
• Address potential sources of bias.	
II. Conduct the sample survey, observational study, or experiment.	
• Use the sampling method to collect data for your sample survey, observational study, or experiment.	
III. Summarize the data of the sample survey, observational study, or experiment.	
• Calculate measures of center.	
• Calculate measures of spread.	
• Select the most appropriate method(s) to display the data (dot plot, histogram, stem-and-leaf plot, box-and-whisker plot, normal curve).	
• Describe the characteristics of the graphical display.	
IV. Analyze the data of the sample survey, observational study, or experiment.	
• Use confidence intervals to determine a range of values for the population mean(s) or proportion(s).	
• Using statistical significance to make inferences about populations.	
V. Draw conclusions based on the results of the sample survey, observational study, or experiment.	
• Write a conclusion that answers the question of interest of your sample survey, observational study, or experiment. Use the data and data analysis to justify your conclusion.	

Be prepared to share your results and methods.

Homework

Finish lesson 2.5