

## Questions on lesson 2.3?

We will be having our concept mastery quiz shortly.

\*\*Quiz questions online to correct mistakes for retaking quizzes.

NO QUIZ TODAY!!

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- The lower bound of a 99.7% confidence interval ranges from 3 standard deviations below the sample proportion to 3 standard deviations above the sample proportion.

7. Determine each confidence interval for the election poll.

a. 68%  
 $54\% \pm 1(1.5\%)$   
 52.5% to 55.5%

b. 95%  
 $54\% \pm 2(1.5\%)$   
 51% to 57%

c. 99.7%  
 $54\% \pm 3(1.5\%)$   
 49.5% to 58.5%

confidence intervals

M.O.E.  
margin of error

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10. Use a 95% confidence interval to determine a margin of error and a range of values for each population proportion.

a. A survey of 1500 teenagers shows that 83% do not like waking up early in the morning.

$\hat{p}$

Standard dev.  $\sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \rightarrow \sqrt{\frac{0.83(1-0.83)}{1500}} \approx 0.00969$   
 $\approx 0.97\%$

$83\% \pm 2(0.97\%)$  —  $83\% - 2(0.97\%) = 81.06\%$   
 $83\% + 2(0.97\%) = 84.94\%$

\*95% C.I. is between 81.06% and 84.94%.

b. A survey of 200 licensed high school students shows that 16% own their own car.

## FROM LESSON 2.3 - PG.80 IN YOUR BOOK

**PROBLEM 2** Sweet Dreams: Exploring Continuous Data

Just like with the categorical data, a more practical method for estimating the population mean amount of sleep for High Marks High School students is to use the sample mean to calculate an estimate for the standard deviation of the sampling distribution. The formula for the standard deviation of a sampling distribution for continuous data is  $\frac{s}{\sqrt{n}}$ , where  $s$  is the standard deviation of the original sample and  $n$  is the sample size.

pg.80 #2  $\frac{s}{\sqrt{n}} \rightarrow \frac{0.8}{\sqrt{50}} \approx 0.11 \text{ hr.}$  #3 P.81

7.7  $\pm$  2(0.11)  
7.48 hours &  
7.92 hours is our 95% C.I.

NOT IN YOUR BOOK

2. Two hundred teenage boys were surveyed about the number of hours they spend each week playing video games. The sample mean was 11.7 hours and the standard deviation was 3.4 hours.

a. Determine the standard deviation for the population mean.

$$\frac{s}{\sqrt{n}} \rightarrow \frac{3.4}{\sqrt{200}} \approx 0.24$$

b. Determine a 95% confidence interval for the population mean.

$$11.7 \pm 2(0.24)$$

11.22 to 12.18 hours is our 95% C.I.

3. Five hundred teenage girls were surveyed about the number of hours they spend each week listening to music. The sample mean was 9.2 hours and the standard deviation was 2.7 hours.

a. Determine the standard deviation for the population mean.

$$\frac{2.7}{\sqrt{500}} \approx 0.12$$

b. Determine a 95% confidence interval for the population mean.

$$9.2 \pm 2(0.12)$$

8.96 to 9.44 hrs is our 95% C.I.

## How Much Different?

2.4

### Using Statistical Significance to Make Inferences About Populations

pg. 87 in your book

The term **statistically significant** is used to indicate that a result is very unlikely to have occurred by chance. Typically, a result that is **more than 2 standard deviations from the mean, or outside a 95% confidence interval, is considered statistically significant.**

#### 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?

Take 10 minutes to work on Problem 1 with your groups on pgs.86-89

### PROBLEM 1 Whatta Water: Exploring Categorical Data

Commercials on a local TV station claim that Whatta Water tastes better than tap water, but a local news anchor does not believe the claim. She sets up an experiment at a local grocery store to test the claim. A representative, unbiased sample of 120 shoppers participate in the tasting survey using unmarked cups. Out of the 120 people, 64 said Whatta Water tastes better than tap water.



1. If shoppers had to choose one or the other and there was no difference in the tastes of the two waters, what proportion of shoppers would you expect to say that Whatta Water tastes better? Explain your reasoning.

50%

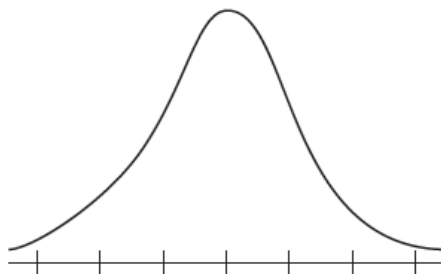
2. What is the sample proportion of shoppers who stated that Whatta Water tastes better?

$$\hat{p} = \frac{64}{120} = 0.53 = 53\%$$

3. Based on your answers to Questions 1 and 2, what reason(s) can you give to doubt Whatta Water's claim? Explain your reasoning.

4. Use a 95% confidence interval to determine a range of values for the population proportion of people who prefer the taste of Whatta Water. Explain your work.

5. Use the sample proportion and standard deviation of the sampling distribution to label the horizontal axis of the normal curve.



Percent Who Prefer Whatta Water to Tap Water

6. Based on the range of values of the 95% confidence interval, what conclusion can you make about Whatta Water's claim that their water tastes better than tap water?

Whatta Water's claim is probably

not true, because 50% is in the 95% confidence interval.

The sample proportion of 53% statistically significant.





Homework

Finish lesson 2.4 through pg. 99