

**Tuesday, January 17: 8.1 Confidence Intervals: The Basics, part 1**

How is this chapter different than chapter 7?

Activity: The Mystery Mean

Read 469-470

What is a point estimate? Why is it called a point estimate?

Explain the logic of confidence intervals.

Read 470-473

What is a confidence interval?

What is the confidence level?

What is the margin of error?

Why do we include the margin of error?

Read 473-476

How do you interpret a confidence level? In other words, what does it mean to be 90% confident?

How do you interpret a confidence interval?

Alternate Example: According to [www.gallup.com](http://www.gallup.com), on August 13, 2010, the 95% confidence interval for the true proportion of Americans who approved of the job Barack Obama was doing as president was  $0.44 \pm 0.03$ . Interpret the confidence interval and the confidence level.

**HW #7: page 481 (5–13 odd)**

**Wed/Thurs, January 18/19: Chapter 7 Test**

## **Friday, January 20: 8.1 Confidence Intervals: The Basics, part 2**

Review: In a 2009 survey, researchers asked teens and adults if they use social networking sites. Overall, 73% of the teens said yes and 47% of the adults said yes. A 90% confidence interval for the true difference in the proportion of teens and adults who would say yes is 0.229 to 0.291.

(a) Interpret the confidence level.

(b) Interpret the confidence interval.

(c) Based on the interval, is there convincing evidence that the proportion of teens who would say yes is higher than the proportion of adults who would say yes? Explain.

Read 476-478

What is the formula for calculating a confidence interval? Is this formula included on the formula sheet?

How can we reduce the margin of error in a confidence interval? Are there any drawbacks to these actions?

Read 478-480

What three conditions need to be met to calculate a confidence interval? Why? What happens if these conditions are violated?

**HW #8: page 481 (15–19 odd, 21–24)**

**Monday, January 23: 8.2 Confidence Intervals for a Proportion**

Read 484-486

What are the three conditions for constructing a confidence interval for a proportion?

Read 487-490

What is the difference between the standard deviation of a statistic and the standard error of a statistic?

What is the formula for the standard error of the sample proportion? How do you interpret this value?  
Is this formula on the formula sheet?

What is a critical value? How is it calculated? What's up with the \*?

Alternate Example: Find the critical value for a 96% confidence interval for a proportion.

What is the formula for a one-sample  $z$  interval for a proportion? Is this formula on the formula sheet?

Alternate Example: Students in an AP Statistics want to estimate the proportion of pennies in circulation that are more than 10 years old. To do this, they gathered all the pennies they had in their pockets and purses. Overall, 57 of the 102 pennies they have are more than 10 years old.

(a) Identify the population and the parameter of interest.

(b) Check the conditions for calculating a confidence interval for the parameter.

(c) Construct a 99% confidence interval for the parameter.

(d) Interpret the interval in context.

(e) Is it possible that more than 60% of all pennies in circulation are more than 10 years old?

## **Tuesday, January 24: 8.2 Confidence Intervals for a Proportion**

Read 490-492

What is the four-step process for calculating a confidence interval? What do you need to do in each step? Do you always have to do the four steps?

Is it OK to use your calculator to calculate the interval?

Alternate Example: *Kissing the right way?*

According to an article in the *San Gabriel Valley Tribune* (February 13, 2003), “Most people are kissing the ‘right way.’” That is, according to the study, the majority of couples tilt their heads to the right when kissing. In the study, a researcher observed a random sample 124 couples kissing in various public places and found that 83/124 (66.9%) of the couples tilted to the right. Construct and interpret a 95% confidence interval for the proportion of all couples who tilt their heads to the right when kissing.

Read 492-494

What is the formula for the margin of error for a confidence interval for a proportion? Is this formula on the formula sheet?

How do you choose a value for  $\hat{p}$  when solving for the sample size?

Alternate Example: *Tattoos*

Suppose that you wanted to estimate  $p =$  the true proportion of students at your school who have a tattoo with 98% confidence and a margin of error of no more than 0.10. How many students should you survey?

**HW #10 page (35–47 odd)**

### Wed/Thurs, January 25/26: 8.3 Confidence Intervals for a Mean

Read 499-501

Will we ever calculate a confidence interval for a mean when the population standard deviation is known?

How can we choose an appropriate sample size when we plan to calculate a confidence interval for a mean?

Alternate Example: *How much homework?*

Administrators at your school want to estimate how much time students spend on homework, on average, during a typical week. They want to estimate  $\mu$  at the 90% confidence level with a margin of error of at most 30 minutes. A pilot study indicated that the standard deviation of time spent on homework per week is about 154 minutes. How many students need to be surveyed to estimate the mean number of minutes spent on homework per week with 90% confidence and a margin of error of at most 30 minutes?

Read 501-506

Activity: Calculator Bingo

What statistic follows a  $t$  distribution?

When do we use the  $t$  distribution?

Describe the shape, center, and spread of the  $t$  distributions.

Alternate Example: Suppose you wanted to construct a 90% confidence interval for the mean  $\mu$  of a Normal population based on an SRS of size 10. What critical value  $t^*$  should you use?

What if you wanted to construct a 99% confidence interval for  $\mu$  using a sample of size 75?

Read 507-510

What is the formula for the standard error of the sample mean? How do you interpret this value? Is this formula on the formula sheet?

What is the formula for a confidence interval for a population mean? Is this formula on the formula sheet?

What are the three conditions for constructing a confidence interval for a population mean?

Alternate Example: *How much homework?*

The principal at a large high school claims that students spend at least 10 hours per week doing homework, on average. To investigate this claim, an AP Statistics class selected a random sample of 250 students from their school and asked them how long they spent doing homework during the last week. The sample mean was 10.2 hours and the sample standard deviation was 4.2 hours.

- (a) Construct and interpret a 95% confidence interval for the mean time that students at this school spent doing homework in the last week.
- (b) Based on your interval in part (a), what can you conclude about the principal's claim?

**HW #11: page 498 (49–52), page 518 (55, 57, 59, 65, 67)**

**Friday, January 27: 8.3 Confidence Intervals for a Mean**

Read 511-514

What is a robust inference procedure? What happens if the Normal condition is violated?

When is it OK to use  $t$  procedures if we do not know that the population has a Normal distribution?

If  $n < 15$ :

If  $15 \leq n < 30$ :

If  $n \geq 30$ :

How can you lose credit for the Normal condition on the AP Exam?

What should you do if you think the Normal condition isn't met?

Can you use your calculator for the Do step? Are there any drawbacks to this?

Read Example on 508-509

Alternate Example: *Can you spare a square?*

As part of their final project in AP Statistics, Christina and Rachel randomly selected 18 rolls of a generic brand of toilet paper to measure how well this brand could absorb water. To do this, they poured 1/4 cup of water onto a hard surface and counted how many squares it took to completely absorb the water. Here are the results from their 18 rolls:

29	20	25	29	21	24	27	25	24
29	24	27	28	21	25	26	22	23

Construct and interpret a 99% confidence interval for  $\mu$  = the mean number of squares of generic toilet paper needed to absorb 1/4 cup of water.

**HW #12: Page 518 (63, 64, 71, 73, 75-78)**

**Monday, January 30: Chapter 8 Review**

Frappy: 2010B #4 (Mike and Lori's iPod)

**HW #13: Page 522 Chapter review exercises**

**Tuesday, January 31: Chapter 8 Review**

**HW #14: page 524 AP Practice Test**

**Wed/Thurs, February 1/2: Chapter 8 Test**