

**Activity 1. (10 minutes) Minitab Test 2 problem**

**Activity 2. Review of hypothesis testing.**

Do Exercise 15.30

**Activity 3. Planning a Study – confidence intervals**

Recall Example 14.3 “Confidence Intervals for a Population Mean” page 359. The margin of error for the 95% confidence interval was \$0.88. What if we decided that interval was not precise enough for our purposes and we wanted a 95% confidence interval for the mean tip that had a margin of error of \$0.25. What would we have to do?

**Activity 4. Planning a Study – hypothesis tests**

Outcomes of a hypothesis test. Put checks and Xs appropriately in the boxes to indicate correct decisions and incorrect decisions.

		Truth about the population	
		Ho true	Ha true
Conclusion based on the sample data	Reject Ho		
	Fail to reject Ho		

Consider these two scenarios. Describe the errors and their consequences.

<p>A. Ho: Defendant is innocent Ha: Defendant is guilty</p> <p>Type I error:</p> <p>Consequence of Type I error:</p> <p>Type II error:</p> <p>Consequence of Type II error:</p>	<p>B. Ho: Airport security is adequate Ha: Airport security is not adequate</p> <p>Type I error:</p> <p>Consequence of Type I error:</p> <p>Type II error:</p> <p>Consequence of Type II error:</p>
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Back to the original picture of the Types of Errors:

How can we minimize the chance of making a Type I error?

What would that do to the chances of making a Type II error?

So, for each of the above scenarios, if you have to choose among these significance levels, which will you choose? (0.10, 0.05, 0.01) Write your guidelines:

If the Type I error is worse than the Type II error, I will choose the significance level to be \_\_\_\_\_.

If the Type II error is worse than the Type I error, I will choose the significance level to be \_\_\_\_\_.

If the two types of error are about equally bad, I will choose the significance level to be \_\_\_\_\_.

“Calculating the power of a test” pages 402-405 (**We will omit this material.**)

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We will not talk about this following material very much in class. Please read it before next week and we'll discuss your questions about it on Monday of next week.

**Conditions for inference:**

1. Simple Conditions in Ch. 14 introduction, page 352. (Relevant to both chs. 14 and 15)
2. Checking the conditions in Example 14.3 in “Confidence Intervals for a Population Means” on pages 359-360.
3. Checking the conditions for Example 15.6 in “Tests for a Population Mean” on pages 380-381.
4. “Conditions for Inference in Practice” in Ch. 16.
  - a. How did we obtain the data? Why is SRS necessary? (In Ch. 16 “Conditions for Inference”)
  - b. What about the shape of the population distribution? Is the condition about normality of population really necessary?
  - c. Is the condition about knowing the pop'n standard deviation really necessary? (Answer: No. See later chapters in text.)

**Cautions about confidence intervals:**

What errors does the margin of error NOT cover?

**Cautions about significance tests:**

How small a P is convincing?

Significance depends on  $H_a$

Significance depends on sample size

How is practical significance differ from statistical significance? Discussion in class next Monday.

What is the potential problem with multiple analyses? Discussion in class next Monday.

**More to discuss in class next Monday and Wednesday:**

**Cautions about hypothesis testing:**

Discuss: Practical significance versus statistical significance (Example: hypothesis test about the average weight loss at “Slimming” gym.)

Discuss: Multiple analyses: (Example: Studies of whether various food dyes are carcinogenic)

**Additional ideas: (Not needed for Test 3, but we’ll need these ideas later.)**

1. Relationship between confidence intervals and two-sided hypothesis tests. (Ch. 15, exercises 15.42 and 15.43)

Comments:

- a. It has to be a two-sided test. If it is a one-sided test, you can probably give an opinion, but you probably can’t give appropriate information about the significance level at which your conclusion holds.
  - b. This is less satisfactory than carrying out the hypothesis test calculations because you don’t actually find the p-value of the data. In this course, unless otherwise indicated, I expect you to give the p-value as part of the conclusion of any hypothesis test.
2. You have learned to use the Normal Table to find p-values. We can also use Table C (t-table) to find approximate p-values. That is, we will find an appropriate interval to describe the size of the p-value. (Ch. 15, Example 15.7 in “Significance from a Table.”) We’ll do this A LOT in Chs. 18 and 19.

**Quiz 9:** Due Wednesday, ~~April 3~~ **March 27** at the beginning of class

17.74, 17.80, 18.18, 18.32, 18.34