

Exam 5/Chapter 9

The data for this exam can be found in the file *exam5data.xls*

1) Answer true or false to each of the following:

- (a) ___ If $\bar{x}_1 - \bar{x}_2 < 0$ then you may assume that $\mu_1 - \mu_2 < 0$.
- (b) ___ If you reject the null hypothesis at the $\alpha = 0.01$ level of significance then you will also reject the null hypothesis at the $\alpha = 0.05$ level of significance.
- (c) ___ If $0.02 < p_1 - p_2 < 0.05$ is a 95 confidence interval then we can conclude that $p_1 > p_2$
- (d) ___ When comparing two population proportions \bar{p} will always be between \hat{p}_1 and \hat{p}_2 .
- (e) ___ Statistics has many, many, many, many real life applications.

On all hypothesis tests you may use either the critical region method or the p-value method but you must note which method you are using and show all appropriate steps.

2) 9 students who had taken the SAT before enrolling in a SAT preparation course and then taken the SAT after the course were randomly selected. In order to determine if the course is effective in raising the students SAT score, the following null and Alternate Hypothesis was set up (the differences should be measured as *before score – after score*)

$$H_0 : \mu_d = 0$$

$$H_1 : \mu_d < 0$$

- (a) In the context of this problem, what is a type I error?
- (b) In the context of this problem, what is a type II error?
- (c) In your opinion, which error is worse? Why?

Their scores before and after the course were recorded and the results are stored in the file *exam5data.xls* on sheet *number 2*. Finish the test using $\alpha = 0.05$.

3) In the file *exam5data.xls* on sheet *number 3* you will find the current grade that I am giving both section of this class that I am teaching. Find a 95% confidence interval for the difference in means. Can you conclude that there is a difference in the grades I am giving to each section?

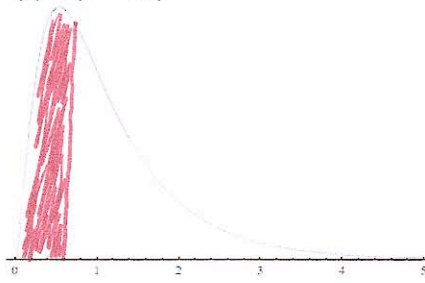
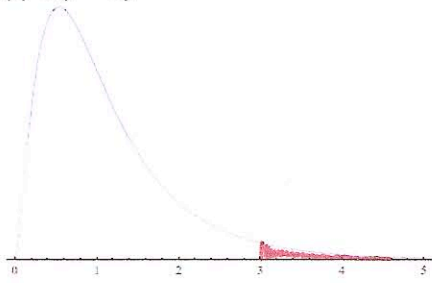
4) In the article "Efficiency and Safety of Echinacea in Treating Upper Respiratory Tract Infections in Children" in the *Journal of the American Medical Association*. It was stated Among 337 children treated with Echinacea, the mean number of days with fever was 0.81 with a standard deviation of 1.50 days. Among 370 children given a placebo, the mean number of days with fever was 0.64 with a standard deviation of 1.16 days. Use $\alpha = 0.05$ to test to determine if there is a difference in the standard deviation of the number of days of fever.

5) A patient who had undergone triple bypass surgery was tested in the following way. The patient took his pulse at rest then walked for 2 minutes on a treadmill at a 10% grade at 1.7 miles per hour. He then took his pulse again. This test was repeated on 6 different days and the results are stored in the file *exam5data-05.xls* on sheet *number 5* (based on information taken from *Diagnostic Tests with Nursing Implications*). Find a 95% confidence interval for the mean difference in pulse rate before and after the exercise on the treadmill.

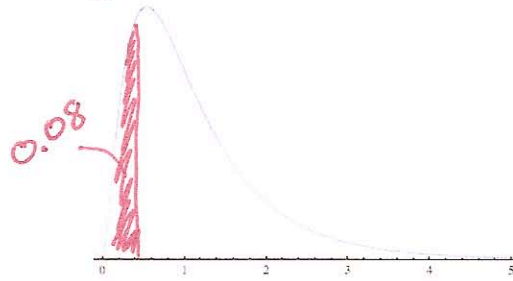
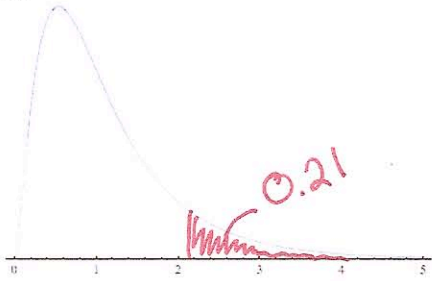
6) In the survey I gave at the beginning of the semester it was recorded that 14 out of 39 students in Math 159-05 and 18 out of 47 students in Math 159-06 were planning on transferring to San Jose State University (Go Spartans!).

- (a) Construct a 90% confidence Interval for the difference in proportions of students who are planning on transferring to San Jose State from each section.
- (b) Use $\alpha = 0.05$ to determine if there is a difference in the proportions of students who are planning on transferring to San Jose State from each section.

7) Find the areas under the F-distribution with 5 df in the numerator and 15 df in the denominator.
 (a) $P(F > 3)$ (b) $P(F < 0.5)$



Find the F-numbers for the F-distribution with 5 df in the numerator and 15 df in the denominator and areas as shown
 (c) (d)



[Faint handwritten notes and diagrams are visible in this section, including a sketch of an F-distribution curve and some illegible text.]