

Graded Homework Set # 5 – Statistics Math 135 (4 problems)

1. A commonly used drug for relieving migraine headaches is believed to be only 60% effective. A new drug, thought to be more effective, was administered to a random sample of 100 adults with migraine headaches. Seventy of the adults received relief. Is this sufficient evidence to conclude that the new drug is more effective than the one commonly prescribed? Conduct the test at the $\alpha = 0.05$ level of significance.

- a. Which of the following sets of hypotheses is the appropriate set to conduct the test? (See page 506)

i.) $H_o : p = 0.60$ ii.) $H_o : p = 0.60$ iii.) $H_o : p = 0.70$ iv.) $H_o : p > 0.70$
 $H_1 : p \neq 0.60$ $H_1 : p > 0.60$ $H_1 : p > 0.70$ $H_1 : p > 0.60$

(See page 545, 546 for b through g below)

- b. What is the value of the sample proportion to be tested?
c. What is the value of the sample standard deviation to be used in calculations?
d. Find the critical value of z.
e. Find the test value of z (z_0).
f. Find the p-value for the test.
g. Is the new drug better? Why or Why not? (Do we accept or reject H_o ?)

2. The average number of students using a computer laboratory per hour was thought to be 16. To test this hypothesis, a day was selected and a sample of the number of students using the lab per hour was taken. The results are shown below:

20 24 18 16 16 19 21 23

At the $\alpha = 0.05$ level, test the claim that the average is actually 16. Use small sampling theory with the t-distribution finding a $t_{\frac{\alpha}{2}}$ (see video cd and how to use

the t-table on page 469) and show your work. (See pages 531 to 534, but with t's instead of z's)

3. A researcher hypothesizes that the average number of sports opportunities colleges offer for males is greater than the average number of sports opportunities colleges offer for women. A survey found that the average number of sports opportunities offered for men by 50 colleges was 8.6 with a standard deviation of 3.3, while the same 50 colleges produced sports opportunities for women with a mean of 7.9 and a standard deviation of 3.3. At the $\alpha = 0.10$ level of significance, is there enough evidence to support the claim? Assume that the two samples are independent and that they have been randomly selected. No credit will be given unless your work is shown. State your hypotheses and conduct the test. What is the conclusion?

(See pages 588 to 591)

4. A sample of 50 randomly selected men with high triglyceride levels consumed 2 tablets of oat bran daily for six weeks. After six weeks, 60% of the men had lowered their triglyceride levels. A sample of 80 men consumed 2 tablets of wheat bran for six weeks. After the six-week period, 25% had lowered triglyceride levels. Is there a significant difference in the two proportions, at the $\alpha = 0.01$ significance level? No credit will be given unless your work is shown. What is your conclusion based on your work? (See pages 602 to 604)