

## STP 226 Group work Ch9

Make sure to include all of the following elements:

- State the null and alternative hypotheses.
- Determine and compute the appropriate test statistics.
- Determine the rejection region or compute the p-value (as requested)
- Decide if the null hypothesis should be rejected, explain why and what it means for alternative hypothesis
- State your conclusion in words, answer question posed in the problem.

1. The owner of a construction company would like to know if his current work crew takes on average less time to build a deck on a house than his past crews. He knows that the average time it took his past crews to build a deck is 28 hours. A random sample of 9 decks that the current crew has built resulted in a sample mean of building time of 24 hours and a sample standard deviation of 6 hours.

Conduct the appropriate hypotheses test using the  $\alpha = 0.05$  and Rejection Region method. Assume that times it takes his current crew to build the decks are normally distributed.

2. The heights of young women are normally distributed with mean  $\mu$  and standard deviation  $\sigma=2.4$  inches. A random sample of 44 women had a sample mean of 68.5 inches. Do we have evidence that  $\mu$  is greater than 67 inches? Test appropriate hypothesis, make your conclusions based on the p-value method. Use  $\alpha = .01$ ?

3. Suppose you test null hypothesis  $H_0 : \mu = 16$  versus  $H_a : \mu \neq 16$  . Answer the following questions:

a) If test statistics  $z=1.25$ , compute the p-value and decide if  $H_0$  be rejected or not at  $\alpha =0.05$ ?

b) If test statistics was  $z=3.14$ , use  $\alpha =0.05$ , find the rejection region and decide if there is evidence for alternative hypothesis at the given  $\alpha$  .

c) If p\_value for the test was .068, would you reject  $H_0$  at 5% significance level?

d) If p-value was .068, and test statistics was positive, what is the p-value if we change alternative hypothesis to to  $H_a : \mu > 16$  ?

e) Suppose We rejected null hypothesis and later we find out that true population mean was 16. Was our decision to reject correct? If not, what type of error was made?

f) Suppose 95% CI for  $\mu$  was (14.6, 17.8). Based on that interval, would null hypothesis be rejected or not?

g) Suppose 95% CI for  $\mu$  was (12.6, 15.1), would you reject null hypothesis based on that CI?

1. A "Get Smaller" weight loss program conducted a preliminary study to test the effectiveness of their program. Six randomly selected clients had their weight recorded before and after 7 weeks of dieting.

Their respective weights in kg are given in the table below:

Patient	A	B	C	D	E	F
weight before= $X_1$	57	67	72	69	70	75
weight after= $X_2$	53	60	73	64	64	70

Do the data suggest that the diet is working? Test appropriate hypothesis, use matched samples t test. and  $\alpha = 0.05$ . Assume that differences (weight before - weight after) are normally distributed.

2. The number of friends consulted for advice before purchasing a car or a computer was examined by a certain consumer research paper. Two independent samples of consumers were selected. The summary statistics consistent with the information in the paper are given in the following table:

Type of purchase	Number of purchases (n)	Mean number of friends consulted ( $\bar{X}$ )	Standard deviation (S)
(1) car	32	3.65	0.42
(2) computer	35	4.26	0.46

Do the data provide sufficient evidence to indicate that the average number of friends consulted prior to purchase is higher for those purchasing a computer than for those purchasing a car? Test appropriate hypothesis using  $\alpha = .10$ . Assume that populations are normal with equal standard deviations.

3. Each person in two independent large random samples of male and female working adults in Calgary, Canada, was asked how long, in minutes, his or her typical daily commute was. The 99% confidence interval for the difference between true mean commute times for male and female working Calgary residents,  $(\mu_1 - \mu_2)$ , is  $(-1.97 \text{ minutes}, 6.37 \text{ minutes})$ .

a. This interval presents no convincing evidence at  $\alpha = 0.01$  that mean commute times for male and female working Calgary residents are different? Explain why.

b. Give an example of confidence interval for  $(\mu_1 - \mu_2)$  that would :

(i) Strongly suggest that  $\mu_1 > \mu_2$

(ii) Strongly suggest that  $\mu_1 < \mu_2$