

Math – 227: Test – 4
Los Angeles City College – Fall 2004

1. There is a claim that the percentage of the proportions of all inner city families living under the poverty level is 25%. A sample of 200 families from the inner cities are chosen to test this claim and 45 of them are found to live under the poverty level. Test this claim with a 95% confidence level.

2. An automobile assembly line operation has a schedule mean completion time of 12.2 minutes. Because of the effect of completion time on both earlier and later assembly operations, it is important to maintain the 12.2 minute standards.
 - a. Define the null and alternate hypothesis and determine the decision rule for conducting the test at a 99% confidence level.
 - b. If a random sample of 45 completion times show $\bar{x} = 12.39$ and $s = 1.20$ minutes, what is your conclusion?
 - c. What is the p – value?

3. The heights of particular plant are normally distributed with a mean of 28 inches. A new plant food is tested on a sample of 12 plants. Results of the sample show a sample mean height of 29.4 inches and sample standard deviation of 3 inches. Using a 90% confidence level, is there a reason to believe that the new plant food *increases* plant growth? Show your null and alternate hypothesis as well as your final conclusion in words.

4. To test the effectiveness of a new pain – relieving drug, 80 patients at a clinic were given a pill containing the drug and 80 others were given a placebo. At a 0.01 level of significance, what can we conclude about the effectiveness of the drug, if in the first group 56 of the patient felt a beneficial effect while 38 of those who received the placebo felt a beneficial effect?

5. City Trucking, Inc. claims consistent delivery times for its routine customer deliveries. A sample of 22 truck deliveries shows a sample variance of 1.5. Test to determine if the company can justifiably claim that the variance in its delivery is 1 hour or less at a 95% confidence level. Show your null and alternate hypothesis as well as your final conclusion in words.

6. A firm with some department stores located in the inner cities and some in the suburban shopping centers is trying to learn about the difference between the characteristics of the inner city shoppers versus the suburban ones. A sample of 60 inner – city and 80 suburban customer ages is summarized below:

Store Type	Sample Size	Sample Mean Age	Sample standard deviation
Inner city	$n_1 = 60$	$\bar{x}_1 = 40$ years	$s_1 = 9$ years
Suburban	$n_2 = 80$	$\bar{x}_2 = 35$ years	$s_2 = 10$ years

Test the claim that the average age of the inner city shoppers is higher than the average age of the suburban shoppers with a 95% confidence level? Show your null and alternate hypothesis as well as your final conclusion in words.

7. Automobile gasoline mileage tests were conducted for similar – sized foreign and domestic automobiles. Test the hypothesis that the mean number of miles per gallons of the foreign cars is more than the domestic automobiles based on the following table and a 95% confidence level. Show your null and alternate hypothesis as well as your final conclusion in words.

	Foreign automobile	Domestic automobiles
Sample size	$n_1 = 8$	$n_2 = 10$
Sample mean	$x_1 = 36.5$	$x_2 = 32.4$
Sample st-dev	$s_1 = 2.3$	$s_2 = 2.8$

8. Use the following paired data consisting of times that movies showed tobacco use and the time that they showed alcohol use.

	Tobacco use (sec)	Alcohol use (sec)
Snow White	0	0
Pinocchio	223	80
Sword & the Stone	37	20
Robin Hood	0	37
Cinderella	37	0
Peter Pan	51	33

Is there sufficient evidence to conclude that the times are different using a 95% confidence level?

9. Construct a 99% confidence interval estimate of the mean of the differences between the tobacco use and the alcohol use in problem # 8 above?
10. Refer to the following table which represents the measured nicotine contents (in mg) of randomly selected filtered and non filtered cigarettes. Use a 0.05 significance level to test the claim that cigarettes with filters have amounts of nicotine that vary more than amounts of nicotine in non filtered cigarettes.

Filtered	Non Filtered
$n_1 = 21$	$n_2 = 8$
$x_1 = 0.94$ mg	$x_2 = 1.65$ mg
$s_1 = 0.31$ mg	$s_2 = 0.16$ mg