

Problems Using Inference – Mixed Review

1. A software company is trying to decide whether to produce an upgrade of one of its programs. Customer would have to pay \$100 for the upgrade. For the upgrade to be profitable, the company needs to sell it to more than 20% of its customers. You contact a random sample of 60 customers and find that 16 would be willing to pay \$100 for the upgrade. Do the sample data give good evidence that more than 20% of the company’s customers are willing to purchase the upgrade?

2. A study conducted in Charlotte, NC, tested the effectiveness of 3 police responses to spouse abuse: advise and separate, citations, and arrests. When presented with an eligible case, a police officer called the dispatcher, who randomly assign one of three available treatments to be administered. There were a total of 650 case in the study. Each case was classified according to whether the abuser was subsequently arrested within six months of the original incident. The table show the result:

Subsequent arrest?	Treatment		
	Advise and separate	Citation	Arrest
Yes	187	181	175
No	25	43	39

Is there evidence the proportion of responses for all 3 responses is not as claimed?

3. Pat wants to compare the cost of one and two bedroom apartments. She collects data for a random sample of 10 advertisements for each type. The table below shows the rents for the selected apartments:

1 bed	500	650	600	505	450	550	515	495	650	395
2 bed	595	500	580	650	675	675	750	500	495	670

Pat wonders if 2 bedroom apartments rent for significantly more on average that one bedroom apartments. Provide evidence for or against Pat’s claim.

4. A large distributor of gasoline claims 60% of all cars stopping at their service stations choose regular unleaded gas and that premium and supreme are each selected 20% of the time. To investigate this claim, researchers collected data from a random sample of drivers who put gas in their vehicles at the distributor’s service station in a large city. The results are as follows:

	Gasoline Selected		
	Regular	Premium	Supreme
	261	51	86

Carry out a test of the distributors claim.

5. A random sample of 100 of a certain popular car model last year found 20 had a certain minor defect in the brakes. The car company made an adjustment in the production process to try to reduce the proportion of cars with the brake problem. A random sample of 350 of this year’s model found that 50 had the minor brake defect. Was the company’s adjustment successful?

6. A researcher collected data on average per capita wine consumption and heart disease death rate in a random sample of 19 countries. The following table displays the data:

Alcohol from wine (L/yr)	2.5	3.9	2.9	2.4	2.9	0.8	9.1	2.7	0.8
Death rate (per 100,000)	211	167	131	191	220	297	71	172	211

Alcohol from wine (L/yr)	0.7	7.9	1.8	1.9	0.8	6.5	1.6	5.8	1.3	1.2
Death rate (per 100,000)	300	107	167	266	227	86	207	115	285	199

Is there statistically significant evidence negative linear relationship between these variables?

7. A government reports says that the average amount of money spent per US household per week on food is about \$158. A random sample of 50 households in a small city is selected, and their weekly spending on food is recorded. The sample data have mean \$165 and standard deviation \$20. Is there convincing evidence the mean weekly spending of this city differs from the US average?

8. Students in a stats class designed an experiment to measure memory retention with and without drinking a cup of coffee 1 hour before a test. This experiment took place on two days in the same week with 10 students. Each student received one cup or no coffee one hour before the test on a particular day. The test consisted of a series of words flashed on the screen after with the student had to write down as many words as possible. On the other day, the student received the other amount of coffee. Using the table below of experiment results, determine whether there is convincing evidence that drinking coffee improves memory:

Student	1	2	3	4	5	6	7	8	9	10
No cup	24	30	22	24	26	23	26	20	27	28
1 cup	25	31	23	24	27	25	28	20	27	30