COMPARING POPULATIONS

TEXT:

LAST NAME	FIRST NAME	DATE

1 (3 points)**.** A sample of five third-graders took a reading test. Then, after participating in a reading improvement program, they took the test again to determine whether their reading ability had improved. Following are the test scores for each of the students before and after the program. Can we conclude that the mean reading score increased at 5% significance level?

Subject	**1**	**2**	**3**	**4**	**5**
Before	59	63	81	74	78
After	67	68	78	75	84
A – B					

Hint:

start by computing the sample of differences.

(a) H_0 : H_1 :

(b) State the distribution of the test statistic:

(c) Sketch a graph of the distribution of the test statistic, find and label the critical point(s), shade the rejection region.

(d) Compute the test statistic and sketch it on the graph above.

(e) Find the p-value of the test.

(f) State the conclusion.

2 (3 points)**.** The Harris Poll conducted a survey in which they asked, "How many tattoos do you currently have on your body?" Of the 1205 males surveyed, 181 responded that they had at least one tattoo. Of the 1097 females surveyed, 202 responded that they had at least one tattoo. Is there sufficient evidence to conclude that the proportion of males with tattoos is greater than the proportion of females with tattoos? Run an appropriate test with $\alpha = 0.05$.

(a) H_0 : H_1 :

(b) Find the point estimate(s) for the population parameter(s).

(c) Find the p-value of the test.

(d) State the conclusion.

3 (3 points)**.** California DMV wants to follow up on a complaint that the average customer waiting times at its Sacramento location are at least half an hour longer than at any other location. Two independent samples of customers waiting in line are taken: one in Sacramento, and the other one in San Jose. The waiting times in minutes are listed below. At 10% significance level, is there enough evidence for the claim in the complaint?

San Jose	42	50	32	43	77	31	103	30
Sacramento	107	115	110	116	98	125		

(a) H_0 : H_1 :

(b) Find the point estimate(s) for the population parameter(s).

(c) Find the p-value of the test.

(d) State the conclusion.

4 (3 points)**.** For the sample data listed in the table below, use 0.05 significance level to test the claim that the proportion of black drivers stopped by the police is different than the proportion of white drivers who are stopped.

Drivers	Black	White
Observed	200	1400
Stopped by police	24	147

(a) H_0 : H_1 :

(b) Find the point estimate(s) for the population parameter(s).

(c) Find the p-value of the test.

(d) State the conclusion.

5 (Optional)**.** Use the data above to run a classical Z-based test by hand: sketch the distribution of the test statistic, the critical value(s), the rejection region, and the test statistic itself. Note the differences between these results and those obtained via the Chi-squared test you used above.

6 (3 points)**.** Biologists want to know if the reindeer who live in North America are significantly heavier than the ones who live in Eurasia. Two independent samples of reindeer are taken, and weights in pounds are measured:

American	381	404	335	216	423	367	255		
Eurasian	188	229	242	355	384	316	265	315	224

Conduct an appropriate test with 80% confidence level.

(a) H_0 : H_1 :

(b) Find the point estimate(s) for the population parameter(s).

(c) Find the p-value of the test.

(d) State the conclusion.

7 (Optional)**.** Use the data above to run a classical test by hand: sketch the distribution of the test statistic, the critical value(s), the rejection region, and the test statistic itself.