

Instructions: You must answer either question 1 & 2 or 2 & 3. Do not answer all of them! Just 2 will do and partial credit will not be assigned for any portion of the 3rd completed. You have the entire 3 hours, but no more to complete this test. I would expect you to be done in 2 hours. Good luck!

1. The following data is a cross-tabulation of survey data for voters that will vote for Brown or Whitman in the gubernatorial race in California, based on areas of primary concern. For the following data answer the questions that follow. Use appropriate round-off for probabilities.

	Education	Economy	Environment
Brown	40	65	28
Whitman	21	44	9

- a) What type of data is this?
- b) What is the probability that a randomly chosen person will vote for Whitman?
- c) What is the probability that a randomly chosen person's major concern is the environment or they will vote for Whitman?
- d) What is the probability that a randomly chosen person is concerned about the environment and will vote for Whitman?
- e) Brown won the popular vote. Does this data support that outcome? Based on the sample data, test my claim at the 90% confidence level. You must give H_0 , H_A , Critical Value, Test Statistic and state the conclusion in terms of the question (not reject or fail to reject). Use correct notation.

- f) Give an 85% confidence interval for the true proportion of the population that will vote for Whitman. You must show the work in using your calculator to arrive at your z for the margin of error, show the margin of error calculation and then give the interval. If you used your calculator to find the interval, show the input for your calculator.
- g) Test the claim that there is at least one difference in the proportions in the population concerned with education, economy, and the environment using an $\alpha = 0.1$. The entire test statistic does not need to be computed, but the work for at least 2 portions must be complete. You must give H_0 , H_A , Test Statistic, you may use a P-Value to test the hypothesis and state the conclusion in terms of the question (not reject or fail to reject). Use correct notation. Show the correct notation for the Test Statistic. If your calculator is used, then show the input that resulted in the given output.
- h) Test the claim that there who you plan to vote for in the upcoming election is dependent upon your area of major concern. Use a 95% confidence level. The entire test statistic does not need to be computed, but the work for at least 2 portions must be complete, including the expected values for Brown/War and Environment/Whitman. You must give H_0 , H_A , Critical Value, Test Statistic and state the conclusion in terms of the question (not reject or fail to reject). Use correct notation.

- i) Given the following summary data, what is the margin of error for the difference between the proportion of the population voting for Brown and the proportion voting for Whitman. Use an $\alpha = 0.2$. Show the margin of error calculation.

Brown	Whitman
$x_1 = 133$	$x_2 = 74$
$n_1 = 325$	$n_2 = 325$

2. Here is the story for the following data. Once you have read the story and understand the scenario, answer the questions that follow:

In a 1948 book called *The Song of Insects*, George W. Pierce, a Harvard physics professor, presented real data relating the number of chirps per second for striped ground crickets to the temperature in degrees F. The data is real cricket and temperature data. Apparently the number of chirps represents some kind of average since it is given to the nearest tenth.

Chirps per sec	Temperature (degrees F)	2-Var Stats	2-Var Stats
20	88.6	$\bar{x} = 16.65333333$	$\uparrow \bar{y} = 80.04$
16	71.6	$\Sigma x = 249.8$	$\Sigma y = 1200.6$
19.8	93.3	$\Sigma x^2 = 4200.56$	$\Sigma y^2 = 96725.86$
18.4	84.3	$Sx = 1.70204359$	$Sy = 6.707330744$
17.1	80.6	$\sigma x = 1.644330326$	$\sigma y = 6.479897119$
15.5	75.2	$\downarrow n = 15$	$\downarrow \Sigma xy = 20127.47$
14.7	69.7	■	■
17.1	82		
15.4	69.4		
16.2	83.3		
15	79.6		
17.2	82.6		
16	80.6		
17	83.5		
14.4	76.3		

- a) What would your first investigation of the data consist of? There should be 3 things that you discuss here. Think assumptions and think visual.
- b) Compute the correlation coefficient of the data. I must see the actual input into

the formula. Use the correct notation.

- c) Is there correlation in this data? Use a 90% confidence level to test the claim. You must give H_0 , H_A , Critical Value, a t-Test Statistic and state the conclusion in terms of the question (not reject or fail to reject). Use correct notation.

- d) Create the regression equation for this data. Be sure to give me all the work for computing b_0 and b_1 as well as the actual equation.

- e) Predict the temperature when a cricket chirps 18 times per second.

- f) Do you think your prediction in e) is valid? Why or why not?

3. For the following data, answer the following questions.

	Democrats	Republicans
n	147	93
x-bar	7.224	6.667
s	2.346	2.752

- a) What type is the data?

- b) Is the mean number of recycled items different based party affiliation? Test the claim that it is at the $\alpha = 0.1$ level

c) In the sample what is the proportion of Democrats?

d) Given the following summary data, give a 90% confidence interval for the difference in the true population proportion of Democrats and Republicans. Show the margin of error calculation.

Democrats	Republicans
$x_1 = 147$	$x_2 = 93$
$n_1 = 323$	$n_2 = 323$

- e) I believe that people are more conscious than ever and are, **on average**, recycling more than 6 items “out of every 10 recyclable items”. Test my claim at the $\alpha = 0.1$ level. This is not a test about proportions. A sample of 324 shows the average number of recycled items to be 6.8 with a standard deviation of 2.7. You must give H_0 , H_A , Critical Value, a Test Statistic and state the conclusion in terms of the question (not reject or fail to reject). Use correct notation.
- f) Give the margin of error for the difference in the mean number of items “out of every 10 recyclable items” recycled by Democrats and Republicans. Use a 95% confidence level. Show the margin of error calculation
- g) Now let’s throw into the mix the fact that there are other party affiliations. Based upon the following summary data, how would you test the claim that there is a difference in the mean number of items recycled based on party affiliation? Give the null and alternative hypotheses.

	Democrats	Other	Republican
n	147	83	93
x-bar	7.224	6.277	6.667
s	2.346	2.973	2.572