Project 1 **Math 121**

Please type your solutions to the questions below in Microsoft Word or Google Docs (or other document editor) and turn in your solutions in class on ***Friday, November 8****. Your grade will be based on three factors: completeness, correctness, and style. To get full style credit you should write all answers in complete sentences. It is okay to discuss the problems with other students, but all of your solutions must be explained in your own words.*

A study published in *Nature* in 2014 reported on an experiment where 38 rhesus monkeys were placed on a restricted calorie diet while another 38 rhesus monkeys were given a normal diet. Below is a table that shows how many of the monkeys in each group had died by age 33.

	Restricted calorie diet	Regular diet
Died by age 33	26	32
Lived past 33 years	12	6
Total	38	38

1. Write a short paragraph about the difference between the survival rates of the two groups of monkeys. That is, describe the percent that survived past 33 years for both groups and say something about the difference.

2. From the data, it looks restricted calorie diets help monkeys live longer, but is this result statistically significant? Carry out an appropriate hypothesis test and explain what the results mean. Be sure to include a statement of the hypotheses, the test statistic (z-value), and the p-value as part of your answer.

3. Find a 95% confidence interval for the difference in survival rates for the two groups of monkeys. Explain in words you are 95% confident is in the interval.

4. Are the samples sizes big enough to trust the results of the two sample inference techniques used here? Explain how you can tell.

5. This was a randomized controlled experiment. Do we need to worry about lurking variables that might be linked to both the explanatory and response variable? Explain why or why not.

6. Write a concluding paragraph to summarize your results. Should we conclude that low calorie diets cause monkeys to live longer? Explain the reasons for your conclusion.