STAT 308 – Homework 1

Your Name

For the problems in which calculations are needed, please include your `R` code with your answers, otherwise you will not be given full credit. Please upload your assignment by Thursday, September 8, 11:59 pm in a pdf file to Sakai.

- 1. Assume that Z is a random variable from the standard normal (i.e. $\mu = 0$, $\sigma = 1$).

– a. Calculate $P(Z \geq -1)$.

– b. Determine the $0.2-$quantile of Z.

- 2. $F_{a,b}$ is a random variable from the F-distribution with $df1 = a$ and $df2 = b$.

– a. Calculate $P(F_{5,40} \leq 2.9)$

– b. Find x such that $P(F_{6,24} \geq x) = 0.05$

- 3. Given a dataset of scores $\{0, 2, 5, 6, 3, 3, 3, 1, 4, 3\}$, calculate the

– a. mean,

– b. median,

– c. variance.

- 4. A random sample of 32 persons attending a certain diet clinic was found to have lost an average of 30 pounds over a three week period, with a sample standard deviation of 11 pounds. For these data

– a. Calculate a 99% confidence interval for the given data.

– b. Interpret the confidence interval in the context of the given problem.

– c. Suppose I wished to test my current belief that the average weight loss of the population is equal to 28 pounds. I come to the conclusion to reject $H_0 : \mu = 28$. Based on your answer to (b), does this make sense? Why or why not?

- 5. An outbreak of Salmonella-related illness was thought to be do pre-cut melons from a specific factory. Several samples were collected and can be found in the file `salmonella.csv` on the course webpage. A Salmonella level (in MPN/g) greater than 0.3 MPN/g is considered dangerous. To demonstrate that the levels are safe we want to show the mean level is less than 0.3 MPN/g.

– a. State the null and directional alternative hypothesis in symbols. Explicitly define μ.

– b. Find the test statistic and p-value for the data below. Be sure to clearly identify them from your output. Note you are performing a one-sided test.

– c. State your decision and conclusion for the given problem.