STA 2122 SEMESTER REVIEW - Chapters 1-8 (not all-inclusive)

1. True/False

a) If events A and B are independent, they are also mutually exclusive.
b) In a normally distributed population, approximately 68% of the measurements will lie within two standard deviations of the mean.
c) The mean of a binomial random variable is np.
d) The variance is the square root of the standard deviation.
e) The binomial and normal distributions are examples of discrete probability distributions.
f) The sample standard deviation is a measure of central tendency.
g) Fifty percent of the measurements in any data set will lie below the mean.
h) If $P(A \cup B) = P(A)P(B)$, the events A and B are independent.
i) The population standard deviation is always a non-negative number.
j) The mean of a population is always a larger number than the standard deviation of that population.
k) A Type II error occurs whenever the null hypothesis is accepted.
l) The larger the p-value, the more support for the alternate hypothesis.

2. The mean weight of American men is 170 pounds with a standard deviation of 30 pounds. Assuming the weights are normally distributed, find the probability that a randomly selected American male weighs more than 175 pounds.

3. Consider the following sample: 2.6, 2.9, 3.1, 2.6, 1.4, 1.3
Find the following:

   a) mean b) median c) mode d) range e) standard deviation

4. In a random sample of 100 voters, 62 were not registered Democrats. Calculate a 97% confidence interval for the proportion of registered Democrats in the population.

5. Suppose 80% of the entering Freshmen at FIU attended high-school in Miami-Dade County. In a random sample of 20 entering Freshmen at FIU, what is the probability at least 16 attended high school in Miami-Dade County?

6. At Sam's Sub Shop, 28% of his customers are over 50, 52% of his customers are women, and 10% of his customers are both over 50 and women. What is the probability a randomly selected customer is either over 50 or a woman?

7. A battery manufacturer claims that its batteries have a mean life of at least 50 hours. In a sample of 100 randomly selected batteries, the mean life is found to be 45 hours with a standard deviation of 4 hours. Do you have enough evidence to dispute the manufacturer's claim using a significance level of .02?

KEY (brief answers provided; show all work on the exam)

1. F, F, T, F, F, F, F, F, T, F, F, F
2. .4325
3. a) 2.32 b) 2.6 c) 2.6 d) 1.8 e) .77
4. (.275, .485)
5. .630
6. .70
7. z = -12.5, yes