

STA 2023 SEMESTER REVIEW - Chapters 1-7 (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,
 - a) Find the probability that a randomly selected American male weighs more than 175 pounds.
 - b) If a random sample of 50 American men is chosen, what is the probability their mean weight exceeds 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. a) .4325 b) .1190
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