MTH 150 Test 2
Fall 2016

Elementary Statistics

Name _____

Justify all answers by showing your work or by providing a coherent explanation. Please circle your answers

1. What is the difference between discrete and continuous probability distributions?

2. If in a normally distributed population, the mean is 60.0 and the standard deviation is 4.0, what is the probability of obtaining a value less than 53.0?

a. 0.9959 **b.** 0.5589 **c**. 0.0401 **d.** 0.0802

3. The diameters of bolts produced by a certain machine are normally distributed with a mean of 0.30 inches and a standard deviation of 0.01 inches. What percent of bolts have a diameter greater than 0.32 inches?

a. 2.28% **b.** 47.72% **c**. 97.72% **d.** 37.45%

4. The lifetimes of light bulbs of a particular type are normally distributed with a mean of 400 hours and a standard deviation of 11 hours. What percentage of bulbs have lifetimes that lie within 1 standard deviation to either side of the mean?

a. 31% **b.** 95% **c**. 68% **d.** 84%

5. Scores on an English test are normally distributed with a mean of 38.8 and a standard deviation of 7.2. What is the 41st percentile?

a. 40.5 **b.** 43.0 **c**. 34.6 **d.** 37.1

6. Glaucoma is an eye disease that is manifested by high intraocular pressure (IOP). The distribution of IOP in the general population is approximately normal with a mean of 16 mm HG and a standard deviation of 3 mm HG. If the normal range for IOP is between 12 and 20 mg HG, then what percent of the general population would fall within this range?

7. In a particular faculty 60% of students are men and 40% are women. In a random sample of 50 students what is the probability that more than half are women? This population is binomially distributed with a mean of $np = 50 \cdot 0.40 = 20$ and variance of $npq = (50)(0.40)(0.60) = 12$. Use the normal approximation to the binomial to solve this problem.

8. In problem **7** above, $P(X > 25) = P(X = 26) + P(X = 27) + \ldots + P(X = 50) = 0.0573$. This calculation is very tedious using discrete methods, Why are we allowed to use the normal distribution to approximate a binomial situation?

9. $\binom{4}{2}$ represents the number of ways 4 items can be arranged taken 2 at a time. If we have the following 4 items, *ABCD*, then *AB*, *AC*, *AD*, *BC*, *BD*, and *CD* are the $\binom{4}{2}$ or 6 of the 4 items taken 2 at a time.

What is the value of $\binom{8}{3}$?

10. A representative from the National Football League's Marketing Division randomly selects people on a random street in Kansas City, Kansas until he finds a person who attended the last home football game. Let *p*, the probability that he succeeds in finding such a person, equal 0.20. And, let *X* denote the number of people he selects until he finds his first success. What is the probability that the marketing representative must select 4 people before he finds one who attended the last home football game?