

DISCUSSION SECTION NUMBER FOR EXAM RETURN \_\_\_\_\_

STATISTICS 2023                      NAME, IN INK \_\_\_\_\_

EXAM TWO                                      SIGNATURE, IN INK \_\_\_\_\_

SPRING 2002                              SS NUMBER, IN INK \_\_\_\_\_

Retain this exam for grade verification once it is graded and returned to you.

TRUE OR FALSE. Answer with a capital T or F. (3 points each)

\_\_\_\_\_ 1. The amount of water flowing per minute through an irrigation pump is a discrete random variable.

\_\_\_\_\_ 2. A continuous random variable is a variable that can be described as the number of success outcomes in  $n$  independent trials.

\_\_\_\_\_ 3. Probability mass functions indicate how much probability occurs at each value of a discrete random variable.

\_\_\_\_\_ 4. The mean or expected value of a discrete random variable is the weighted sum of the values of the variable weighted by their probabilities.

\_\_\_\_\_ 5. If a variable has a standard normal distribution then the mean of the variable is always zero and the standard deviation is always one.

\_\_\_\_\_ 6. The Binomial and the Poisson distributions are always right skewed.

\_\_\_\_\_ 7. The variance of the sample mean is equal to the variance of the original population from which the sample was drawn divided by the size of the sample.

**STANDARD NORMAL DISTRIBUTION QUESTIONS. State the answer on the line provided.** **(3 points each)**

\_\_\_\_\_ 8. Find  $z_0$  if  $P(Z < z_0) = 0.1685$ .

\_\_\_\_\_ 9. Find the  $P(0.87 < Z < 1.56)$ .

\_\_\_\_\_ 10. What is the  $P(Z > -.048)$ ?

STATE THE ANSWER. State the answer on the line given.

(3 points each)

\_\_\_\_\_ 11. Consider a lottery game in which a person can win \$0, \$1, or \$2,000. If the probability of winning \$0 is .98, the probability of winning \$1 is .019, and the probability of winning \$2,000 is only .001, what is the expected winning from this lottery game?

\_\_\_\_\_ 12. Assume an unfair coin is tossed and that the probability of a head on the up face of this coin when it is tossed is 0.70. If this coin is tossed twice what is the probability of two tails on the two tosses?

\_\_\_\_\_ 13. Thirty percent of the students at the University have at some time received a parking ticket on campus. Out of seven randomly chosen students what is the probability that at most four of them have received a parking ticket on campus? State the answer with **three** digits past the decimal.

\_\_\_\_\_ 14. A star basketball player at Oklahoma State University hits 82% of his free throw attempts. If this player is fouled while shooting a three-point basket he would be allowed three free throw attempts. When this player is allowed three free throw attempts what is the probability that he will hit at least two of them? Round your answer to **five** digits past the decimal.

\_\_\_\_\_ 15. The average number of chemical spills at a chemical company west of Tulsa is .4 per month. What is the probability of two chemical spills in one month at this chemical company west of Tulsa? State your answer with **four** digits past the decimal.

\_\_\_\_\_ 16. On average there are 10 DUI arrests (driving under the influence of alcohol) in Payne County every Saturday night. What is the probability of fewer than two DUI arrests on one Saturday night if the average is 10? Round your answer to **six** digits past the decimal.

STATE THE ANSWER. State the answer on the line given.

(4 points each)

The amount of blood needed at a hospital during each twenty-four hour period is uniformly distributed between the values of 80 pints and 180 pints. Use this information to answer the next three questions.

\_\_\_\_\_ 17. What is the expected amount of blood needed at this hospital in a twenty-four hour period?

\_\_\_\_\_ 18. What is the probability that the hospital would need more than 160 pints of blood in a twenty-four hour period?

\_\_\_\_\_ 19. To provide appropriate services, the hospital needs to have in storage the amount of blood needed for next twenty-four hour period. How many pints of blood should they have in storage at the beginning of each twenty-four period if they want to have enough blood in storage so that there is only a 2% chance of running out of blood in any twenty-four hour period?

Assume that the random variable  $X$  has a normal distribution with a mean of 56 units and a standard deviation of 8 units. Use this information to answer the next three questions.

\_\_\_\_\_ 20. Find the value of  $x_0$ , such that  $P(X > x_0) = 0.0384$ .

\_\_\_\_\_ 21. If the distribution of  $X$  is as described above what is the probability that  $X$  has values between 38 and 52?

\_\_\_\_\_ 22. If the distribution of  $X$  is as described above, then what is the value of the 67<sup>th</sup> percentile of the distribution?

**STATE THE ANSWER. State the answer on the line given.**

**(4 points each)**

There was extensive damage to the electrical grid in Western Oklahoma in the recent ice storm. Oklahoma Gas and Electric, OG&E, stated that the cost to replace one-quarter mile of downed utility poles is a normally distributed random variable with a mean of \$22,500 and a standard deviation of \$1,500. Use this information to answer the next three questions.

\_\_\_\_\_ 23. Based on the distribution indicated by OG&E ninety-seven and one-half percent of the time the cost to replace a quarter mile of utility poles is less than what amount?

\_\_\_\_\_ 24. What is the probability that the cost to replace a quarter mile of utility poles exceeds \$26,400?

\_\_\_\_\_ 25. On average what is the cost for OG&E to replace a quarter mile of downed utility poles, assuming the above distribution for the cost is correct?

Assume that samples of 36 observations each were randomly drawn from a population with a mean of 55 and a standard deviation of 18. Use this information to answer the remaining questions.

\_\_\_\_\_ 26. What is the numerical value of the mean of the sampling distribution of the sample mean that would result from the above situation?

\_\_\_\_\_ 27. What is the numerical value of the standard deviation of the sampling distribution of the sample mean that would result from the above situation?

\_\_\_\_\_ 28. Only 0.25% (or 0.0025) of the sample means that result from the above sampling situation will be more than what value?

\_\_\_\_\_ 29. What is the probability that the sample mean which results from the above situation will be between 47.50 and 60.28?