**DISCUSSION SECTION NUMBER FOR EXAM RETURN _____**

**STATISTICS 2023** **NAME, IN INK_____**

**EXAM TWO** **SIGNATURE, IN INK_____**

**SPRING 2001** **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 height of pine trees on campus is a discrete random variable.

_____ 2. A continuous random variable is a variable that only has probability on intervals of values and no probability at all on specific values.

_____ 3. Probability mass functions are functions that indicate the probability for intervals of values of continuous random variables.

_____ 4. The expected value of a variable is the weighted sum of the values of the variable weighted by their probabilities.

_____ 5. When a continuous variable has a standard normal distribution then 68.28% of the probability is associated with values which are within the interval –1 to +1.

_____ 6. The Poisson distribution can be either right or left skewed.

_____ 7. The mean of the sampling distribution of the sample mean is equal to the mean of the original population from which the sample was drawn.

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

_____ 8. Find $z_o$ if $P(Z > z_o) = 0.1685$.

_____ 9. Find the $P( 0.87 < Z < 2.16 )$.

_____ 10. What is the $P( Z > -1.48)$?

**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, or $20,000. If only one person out of 16,000 people who play the lottery game win the $20,000 prize what is the expected winnings in such a lottery game?

_____ 12. Assume that a discrete random variable has four possible values, 15, 20, 25, and 30. If there is 0.30 probability on each of the two values that end in 5, the values 15 and 25, and the remaining probability is divided equally for the other two values of the variable, 20 and 30, then what is the probability that such a random variable is at least the value of 25?

_____ 13. Twenty 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 three 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 84% 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 1.8 per year. What is the probability of two chemical spills next year at this chemical company west of Tulsa? State your answer with **four** digits past the decimal.

_____ 16. On average there are 9 fires on campus in one month. What is the probability of fewer than two fires on campus in one month if the average is 9? 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 800 pints and 1,800 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 1,600 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 488 units and a standard deviation of 52 units. Use this information to answer the next three questions.

_____20. Find the value of $x_o$, such that $P(X > x_o) = 0.0384$.

_____ 21. If the distribution of X is as described above what is the probability that X has values between 423 and 529.6?

_____ 22. If the distribution of X is as described above, then what is the value of the $67^{th}$ percentile of the distribution?

**STATE THE ANSWER. State the answer on the line given. (4 points each)**

The price of natural gas has increased rapidly this winter across the nation. Oklahoma Natural Gas, ONG, indicates that the average cost of heating a 1,600 square-foot house with natural gas for one month this winter is normally distributed with a mean of $224 and a standard deviation of $78. Use this information to answer the next three questions.

_____23. Based on the distribution indicated by ONG ninety-seven and one-half percent of natural gas heating cost for 1,600 square-foot houses for one winter month is below what cost?

_____ 24. What is the probability that the natural gas heating cost for a 1,600 square-foot house for one winter month exceeds $364.4?

_____ 25. Only 1.5% of the time will the natural gas heating cost for a 1,600 square-foot house be less than what amount?

Assume that samples of 900 observations each were randomly drawn from a population with a mean of 875 and a standard deviation of 150. 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 868 and 884?