DISCUSSION SECTION NUMBER FOR EXAM RETURN _____

STATISTICS 2023 **NAME, IN INK_____**

EXAM TWO **SIGNATURE, IN INK_____**

FALL 2000 **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 number of people in a passenger vehicle 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 density functions are functions that indicate the density of the probability for intervals of values of discrete random variables.

_____ 4. The expected value of a variable is the value of the variable that has the greatest probability of occurring.

_____ 5. When a continuous variable has a uniform distribution then the probability density function has a constant value over the range of possible values.

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

_____ 7. The sampling distribution of the sample mean has the same variance as the 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 $P(Z > z_o) = 0.2061$.

_____ 9. Find the $P(1.27 < Z < 2.41)$.

_____ 10. What is the $P(Z > -0.68)$?

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 $12,000. If only one person out of 20,000 people who play the lottery game win the $12,000 prize what is the expected winnings in such a lottery game?

_____ 12. Assume that a discrete random variable has the values of 10, 20, 30, and 40 with 0.40 of the probability on 10, 0.30 probability on 20, 0.20 probability on 30 and the remaining probability on 40. What is the probability that such a random variable is at least the value of 30?

_____ 13.Five percent of the tickets in a certain scratch and win game are winners of at least some prize. Assume you purchase seven tickets what is the chance that at most two of the tickets are winners? State the answer with three digits past the decimal.

_____ 14.If ten percent of web pages on the internet will not load correctly when requested what is the probability out of eleven web pages that you attempt to load from the internet that fewer than two will not load correctly? Round your answer to four digits past the decimal.

_____ 15.If the average number of penalties for a football team in 15 minutes of game play is 1.8 what is the probability of at least four penalties in 15 minutes of game play? State your answer with three digits past the decimal.

_____ 16.If on average there are 8.6 emergencies per day that arrive at a large veterinarian hospital what is probability that in a day there would be twelve or thirteen emergencies? Round your answer to four digits past the decimal.

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

The amount of fill dirt needed monthly by a small local construction company is uniformly distributed between the values of 80 tons and 160 tons. Use this information to answer the next three questions.

_____ 17. What is the expected amount of fill dirt needed monthly by this construction company?

_____ 18. What is the probability that the construction company would need more than 135 tons of fill dirt in one month?

_____ 19. For planning purposes, the construction company needs to stock pile the amount of fill dirt needed for next month's construction projects. How many tons of fill dirt should they have in stock at the beginning of each month if they want to have enough fill dirt in stock so that they only run out 15% of the months?

Assume that the random variable X has a normal distribution with a mean of 334 units and a standard deviation of 18 units. Use this information to answer the next three questions.

_____20. Find the value of x_o, such that $P(X > x_o) = 0.2946$.

_____ 21. If the distribution of X is as described above what is the probability that X has values between 311.14 and 339.04?

_____ 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 fuel consumption of a certain type of car measured in miles per gallon (mpg) is normally distributed with a mean of 34mpg and a standard deviation of 2mpg. Use this information to answer the next three questions.

_____23. Ninety five percent of the time this type of car has fuel consumption between what two mpg values? State the two values.

_____ 24. What is the probability that this type of car exceeds 37.3mpg?

_____ 25. Only 1.5% of the time this type of car has fuel consumption that is less than how many miles per gallon (mpg)?

Assume that a sample of 400 observations was randomly drawn from a population with a mean of 65 and a standard deviation of 50. Use this information to answer the remaining questions.

_____ 26. What is the numerical value of the mean of all possible sample means that would result from the above situation?

_____ 27. What is the numerical value of the standard deviation of all possible sample means 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 less than what value?

_____ 29. What is the probability that the sample mean which results from the above situation will be between 66.25 and 70.5?