

DISCUSSION SECTION NUMBER FOR EXAM RETURN _____

STATISTICS 2023 NAME, IN INK _____

EXAM TWO SIGNATURE, IN INK _____

FALL 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 amount of gasoline that you place into your car when you fill your fuel tank is a discrete random variable.

_____ 2. A continuous random variable is a variable that can be measured more and more precisely.

_____ 3. The probability mass function for a discrete random variable is a function that indicates how much probability is assigned to each value of the random variable.

_____ 4. The most likely value of a discrete random variable is the expected value of the random variable.

_____ 5. When a continuous variable has a normal distribution the probability that the value of the variable is less than the mean is one.

_____ 6. The standard normal distribution is a symmetric distribution which always has a mean value of zero and a standard deviation of one.

_____ 7. The variance of the sampling distribution of the sample mean is equal to the original variance of the population from which the sample was drawn divided by the number of observations in the sample.

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

_____ 8. Find z_0 if $P(Z > z_0) = 0.8944$.

_____ 9. Find the $P(-.53 < Z < 1.89)$.

_____ 10. What is the $P(Z < 0.88)$?

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 98% of all the people who play win \$0 and the probability of winning \$1 is only 0.019 what is the probability of winning \$2,000 in this lottery game?

_____ 12. Assume that a discrete random variable has the values of 10, 15, 20, 25, and 30, with 0.3 probability on each of the values 10, 15, and 20. If the remaining probability is equally divided between the other two values, 25 and 30, then what is the expected value or mean of this discrete random variable?

_____ 13. Assume that twenty percent of the files in certain computer system are contaminated with a computer virus, called VIRO. If you choose seven files at random what is the probability that fewer than three of them are contaminated with the computer virus, VIRO? State the answer with three digits past the decimal.

_____ 14. Twelve percent of the steel beams made by US Steel during one month were found to be $\frac{1}{64}$ of an inch too wide. If you purchased eight of the beams made during that month to use in a bridge construction what is the probability that at most one of the beams you purchased were found to be $\frac{1}{64}$ of an inch too wide? Round your answer to five digits past the decimal.

_____ 15. If the average number of security breaches at a major airport is 1.9 per day what is the probability of no more than three in one day? State your answer with four digits past the decimal.

_____ 16. If on average the computer server serving your company's web page has 4 errors per hour, then what is the probability of either 5 or 6 errors in one hour? Round your answer to two digits past the decimal.

The amount of floor glue needed by a carpet laying crew for a one-day shift is uniformly distributed between the values of 4 and 12 gallons. Use this information to answer the next three questions.

_____ 17. What is the expected amount of floor glue needed for a one-day shift by this carpet laying crew?

_____ 18. What is the probability that the carpet laying crew would need more than 10 gallons of floor glue for a one-day shift?

_____ 19. Every night the construction company who hires the carpet laying crew needs to stock pile the amount of floor glue needed for the next day's shift. How many gallons of floor glue should they have in stock at the beginning of each day if they want to have enough glue on hand so that they only run out 12.5% of the time?

Assume that the random variable X has a normal distribution with a mean of 364 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 $P(X > x_0) = 0.0594$.

_____ 21. If the distribution of X is as described above what is the probability that X has values between 378 and 384.4?

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

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

(4 points each)

The bald eagle, which is a national symbol of the United States, is a very large bird with wingspan that is a normally distributed random variable with a mean of 7.5 feet (90 inches) and a standard deviation of 2 inches. Use this information to answer the next three questions.

_____ 23. Ninety seven and one-half percent of the time the wing span of a bald eagle is more than what width measured in inches?

_____ 24. What is the probability that the wingspan of a bald eagle is wider than 93 inches?

_____ 25. What percent of eagles would be expected to have wingspans that are more than 90 inches wide?

Very tight quality control must be exercised by a manufacturer of stainless steels bolts. The bolts sold as having a length of 2" must be very close to that specific length. In an effort to maintain quality control in the manufacturing plant 64 bolts are randomly chosen from the manufacturing line every hour. Assume the length of the bolts being manufactured has a mean of 2 inches and a standard deviation of .08 inches. 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 sampling 64 bolts?

_____ 27. What is the probability that the sample mean of the bolt lengths from the samples of size 64 is outside of the interval 1.97 inches to 2.03 inches?

_____ 28. Only 2.5% of the sample means based on 64 bolt lengths would be more than what length?

_____ 29. What is the probability that the sample mean that results from the above situation will exceed 2.04?