

STATISTICS 2023

NAME, PRINT IN INK _____

EXAM TWO

SIGNATURE, IN INK _____

FALL 2003

SS or OSU ID #, IN INK _____

Once this exam is graded and returned to you retain it for grade verification.

TRUE OR FALSE. Answer with a capital T or F.

(4 points each)

_____ 1. Continuous random variables have probability only on specific values of the variables.

_____ 2. The expected value of a variable is mean of the variable and indicates the average value of the variable in the long run.

_____ 3. The probability distribution of a discrete random variable indicates the values of the variable and the probability of those values.

_____ 4. The Poisson probability mass function is left skewed, right skewed or symmetric depending on the value of lamda, the mean of the distribution.

_____ 5. The probability density function for the normal distribution is a bell-shaped curve centered at the value of the mean.

Z-table Questions. Write your answer on the line

(4 points each)

_____ 6. What is z_0 , such that $P(Z < z_0) = 0.1587$?

_____ 7. What does $P(0.35 < Z < 1.87)$ equal?

_____ 8. What does $P(Z > 2.2)$ equal?

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

(4 points each)

_____ 9. Assume that a discrete random variable has five possible values, 10, 20, 30, 40, and 50. If the probability on each of the first two values, 10 and 20, is 0.05 and the remaining probability is divided equally for the other three values of the variable, 30, 40, and 50, then what is the expected value of such a random variable?

_____ 10. Consider a lottery game where the players either win \$0, \$2, or \$1200. If the probability of winning nothing is 0.99 and the probability of winning \$2 is 0.009. What is the standard deviation of the winnings of such a lottery game? Round your answer to **three** digits past the decimal.

_____ 11. Suppose you work for an insurance company, and you sell a \$5,000 whole-life insurance policy at an annual premium of \$250, which is the amount the customer is charged for the policy. The probability of death during the next year for a person who is your customer is 0.001. What is the expected annual profit for the insurance company for a policy of this type?

_____ 12. A machine that produces parts for automobile engines is malfunctioning and producing 15% defectives. The defective and non-defective parts are produced by the machine in a random manner. If the next 7 parts are tested, what is the probability that no more than 2 parts are defective?

_____ 13. A lawyer estimates that 36% of the cases in which she represented the defendant were won. If the lawyer is presently representing 8 defendants in different cases, what is the probability that 5 of the cases will be won? Round your answer to **three** digits past the decimal.

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

(4 points each)

_____ 14. The safety supervisor at a large manufacturing plant believes the average of industrial accidents per month is 1.8. What is the probability of at most 3 accidents occurring next month? State your answer with four digits past the decimal.

_____ 15. The auto parts department of an automotive dealership sends out an average of 8.25 special orders daily. What is the probability that for any day, the number of special orders sent out will be exactly 15? Round your answer to **three** digits past the decimal.

(16-18)

The rate at which a swimming pool is filled is uniformly distributed between 30 and 36.6 gallons per minute. Use this information to answer the next three questions.

_____ 16. What is the mean of the rate at which the swimming pool is filled?

_____ 17. What is the standard deviation of the rate at which the swimming pool is filled? Round your answer to **three** digits past the decimal.

_____ 18. What is the probability that the filling rate at any one time is between 31.55 and 32.54?

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

(4 points each)

(19-21)

A company has determined that the assembly time for a particular electrical component is normally distributed with a mean of 45 minutes and a variance of 9 minutes.

_____ 19. What is the probability that an employee in the assembly division takes longer than 40.29 minutes to assemble on this component?

_____ 20. Thirty-four percent of the assembly time an employee takes between 43.71 minutes and what value (This value will be greater than 43.71)?

_____ 21. Only 2.5% of the assembly time an employee takes more than how many minutes?

(22-25)

A random sample of 36 observations is selected from a population with a mean of 120 and a standard deviation of 36. Use this information to answer the remaining questions.

_____ 22. What is the numerical value of the mean of all possible sample means that would result from the above situation?

_____ 23. What is the numerical value of the standard deviation of all possible sample means that would result from the above situation?

_____ 24. Thirty-three percent of the sample means that result from the above sampling situation will be more than what value?

_____ 25. What is the probability that the sample mean which results from the above situation will be between 121.98 and 134.16?