

STATISTICS 2023

NAME, PRINT IN INK _____

EXAM TWO

SIGNATURE, IN INK _____

FALL 2012

CWID 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. A continuous random variable has probability only on the specific values of the variable.

_____ 2. The expected value of a variable is mean of the variable and indicates the spread of the values of the variable around the average.

_____ 3. When the probability distribution of a discrete random variable is displayed in a graph, it is the height of the bar, or line, at each of the values of the variable that indicates the probability.

_____ 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 area under a probability density function indicates the probability for an interval of values for a continuous random variable.

Z-table Questions. Write your answer on the line.

(4 points each)

_____ 6. What is z_0 , such that $P(Z < z_0) = 0.1736$?

_____ 7. What does $P(1.35 < Z < 1.87)$ equal?

_____ 8. What does $P(Z > 2.68)$ equal?

_____ 9. Assume that a discrete random variable has five possible values, 10, 12, 14, 16, and 18. If the probability on each of the first two values, 10 and 12, is 0.125 and the remaining probability is divided equally for the other three values of the variable, 14, 16, and 18, 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 two digits past the decimal.

_____ 11. 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? State your answer with four digits past the decimal.

_____ 12. A lawyer estimates that 36% of the cases in which she represented the defendant were won. If the lawyer is presently representing 10 defendants in different cases, what is the probability that 5 of the cases will be won? Round your answer to five digits past the decimal.

_____ 13. The safety supervisor at a large manufacturing plant knows that the average number of industrial accidents per month is 2.8. What is the probability of fewer than 3 accidents occurring next month? State your answer with four digits past the decimal.

_____ 14. The 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 five digits past the decimal.

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

(4 points each)

On IRS tax forms the instructions indicate that it is appropriate to round all entries to whole dollars. The rounding error that results from this is uniformly distributed between the values of -50 cents and +50 cents. Use this information to work the next two problems and consider the problem with cents as the unit.

_____ 15. What is the probability that the rounding error will be more than 32 cents from the mean? That is, what is the probability that the rounding error will be outside of an interval that is the mean plus and minus 32 cents?

_____ 16. Twenty percent of the time the rounding error exceeds what positive number of cents?

Light bulbs manufactured by the Acme Corporation are rated to last 300 days on average with a standard deviation of 50 days. Assume that the variable, bulb life, is normally distributed. Use this information to answer the remainder of the questions on this page.

_____ 17. What is the probability that a randomly chosen bulb will last more than 365 days?

_____ 18. What is the probability that a randomly chosen bulb will last more than 180 days but less than 280 days?

_____ 19. One and one-half percent of the time the life of this type of bulb is less than how many days?

_____ 20. What is the 67th percentile of the variable, bulb life?

_____ 21. State the interval centered on the mean of bulb life times that contains 95% of the values of the variable.

In order to analyze a new chemical form of asphalt, samples of 36 observations were repeatedly drawn from the asphalt mixture at a large chemical factory. The melting temperature of the asphalt is known to be 290 degree Fahrenheit (290°F) with a standard deviation of 12 degree Fahrenheit (12°F). Use this information to address the questions on this page.

_____ 22. What is the probability that the sample mean from the above sampling situation will be greater than 295°F ?

_____ 23. Thirty-three percent of the sample means that result from the above sampling situation will be more than what value?

_____ 24. What is the probability that the sample mean that results from the above sampling situation will be between 286.92°F and 292.92°F ?

_____ 25. Would a sample mean of at least 298°F be likely to occur from the above sampling situation, if in fact the mean melting temperature of the asphalt is 290°F ? Answer likely, or unlikely.