

**STATISTICS 2023**

**NAME, PRINT IN INK** \_\_\_\_\_

**EXAM TWO**

**SIGNATURE IN INK** \_\_\_\_\_

**SPRING 2010**

**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. Continuous random variables have probability only on specific values of the variable.

\_\_\_\_\_ 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  $P(Z < z_0) = 0.1075$ ?

\_\_\_\_\_ 7. What does  $P(1.35 < Z < 2.87)$  equal?

\_\_\_\_\_ 8. What does  $P(Z > -2.2)$  equal?

\_\_\_\_\_ 9. Suppose a person is shooting at a very small target. Assume that the person hits the target 3.5 percent of time. If the person hits the target, then that person wins \$25,000. If the target is missed the loss is \$500. What is the expected amount of money to be won if the chance to shoot at the target is free?

\_\_\_\_\_ 10. Assume that a discrete random variable has the values of 15, 25, 35, and 45 with probability of 0.40 on 15, 0.30 probability on 25, 0.20 probability on 35 and the remaining probability on 45. What is the probability that such a random variable is at least the value of 35?

\_\_\_\_\_ 11. Fifteen percent of people who buy a ticket in a certain game will win some prize. Assume 20 people purchase these tickets. What is the chance that at most three of them will win some prize? State the answer with four digits past the decimal.

\_\_\_\_\_ 12. Twelve percent of the people who visit the Amazon.com website buy some product. If five people go to Amazon.com, what is the probability that fewer than two of them will buy some product? State your answer with six digits past the decimal.

\_\_\_\_\_ 13. If the average number of customers coming to the counter at a diner in 5 minutes is 1.6, what is the probability that at least three customers will come to the counter in 5 minutes? State your answer with four digits past the decimal.

\_\_\_\_\_ 14. If the average number of accidents in a chemical manufacturing plant is 1.7, per year what is the probability that six accidents occur in one year? 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 rounding error when a price is rounded to the nearest cent is  $1/2$  cent or .005 in terms of dollars. Assume that a store that uses this rounding error knows that the distribution of the rounding error is uniformly distributed between the values of -.005 and .005 when the units are dollars, that is,  $X \sim \text{Uniform Continuous}(-.005, .005)$ . Use this information to answer the next two questions.

\_\_\_\_\_ 15. What is the probability that the rounding error will exceed .002 dollars?

\_\_\_\_\_ 16. Fifteen percent of the time the rounding error will be less than what amount? State the amount in terms of dollars.

**The yearly return on a risky stock** is normally distributed with a mean of 18% and a standard deviation of 24%. Use this information to answer the next five questions.

\_\_\_\_\_ 17. The estimated maximum return on a safer stock is 30%, what is the probability that the risky stock described above has returns that exceed this estimated maximum return?

\_\_\_\_\_ 18. What is the probability that the yearly return on this risky stock is between 22.8% and 46.8%?

\_\_\_\_\_ 19. Sixty-seven percent of the time the yearly return on this risky stock is less than what percent? That is, find the 67th percentile of this distribution.

\_\_\_\_\_ 20. One and one-half percent of the time the yearly return on this risky stock exceeds what percent return? That is, find  $X_0$ , such that  $P(X > X_0) = 0.0150$ .

\_\_\_\_\_ 21. What is the probability that this risky stock will lose money?

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

**(4 points each)**

**The life of a car battery** is measured in months rather than in miles that the car is driven. A certain type of car battery has a mean lifetime of 48 months with a standard deviation of 5 months. Assume that random samples of size one-hundred were repeatedly drawn from batteries of this type and the lifetimes in months were recorded. Use this information to answer the questions on this page.

\_\_\_\_\_ 22. What is the numerical value of the mean of all possible sample means that would result from repeated samples of one-hundred car battery lifetimes?

\_\_\_\_\_ 23. What is the numerical value of the standard deviation of all possible sample means that would result from repeated samples of one-hundred car battery lifetimes?

\_\_\_\_\_ 24. Only 2.5% of the sample means of car battery lifetimes that result from the above repeated sampling situation will be less than what value?

\_\_\_\_\_ 25. What is the probability that the sample means that result from repeated sampling of the car battery lifetimes will be between 47.5 and 49 months?