

**STATISTICS 2023**

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

**EXAM TWO**

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

**FALL 2006**

**CWID, 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.**

**(4 points each)**

\_\_\_\_\_ 1. The amount of water flowing per minute through an irrigation pump is a discrete random variable.

\_\_\_\_\_ 2. A continuous random variable is a variable that can be described as the number of success outcomes in  $n$  independent trials.

\_\_\_\_\_ 3. Probability mass functions indicate how much probability occurs at each value of a discrete random variable.

\_\_\_\_\_ 4. The mean or expected value of a discrete random variable is the weighted sum of the values of the variable weighted by their probabilities.

\_\_\_\_\_ 5. If a variable has a standard normal distribution then the mean of the variable is always zero and the standard deviation is always one.

\_\_\_\_\_ 6. The Binomial and the Poisson distributions are always right skewed.

**STANDARD NORMAL DISTRIBUTION QUESTIONS. State the answer on the line provided.**

**(4 points each)**

\_\_\_\_\_ 7. Find  $z_0$  if  $P(Z < z_0) = 0.1685$ .

\_\_\_\_\_ 8. Find the  $P(0.87 < Z < 1.56)$ .

\_\_\_\_\_ 9. What is the  $P(Z > -0.48)$ ?

\_\_\_\_\_ 10. 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 expected winning amount in this lottery game?

\_\_\_\_\_ 11. Assume that twenty percent of the files in certain computer system are contaminated with a computer virus, called VIRO. If you choose nine files at random what is the probability that fewer than three of them are contaminated with the computer virus, VIRO? State the answer with four digits past the decimal.

\_\_\_\_\_ 12. 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.

\_\_\_\_\_ 13. 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 blood needed at a hospital during each twenty-four hour period is uniformly distributed between the values of 800 pints and 1,800 pints. Use this information to answer the next three questions.

\_\_\_\_\_ 14. What is the expected amount of blood needed at this hospital in a twenty-four hour period?

\_\_\_\_\_ 15. What is the probability that the hospital would need more than 1,600 pints of blood in a twenty-four hour period?

\_\_\_\_\_ 16. To provide appropriate services, the hospital needs to have in storage the amount of blood needed for next twenty-four hour period. How many pints of blood should they have in storage at the beginning of each twenty-four hour period if they want to have enough blood in storage so that there is only a 2% chance of running out of blood in any twenty-four hour period?

**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 five questions.

\_\_\_\_\_ 17. Thirty-three percent of the time this type of car has miles per gallon greater than what specific mpg value?

\_\_\_\_\_ 18. Ninety five percent of the time this type of car has fuel consumption between what two mpg values? State the two values.

\_\_\_\_\_ 19. What is the value of the 50<sup>th</sup> percentile for the distribution of fuel consumption measured in miles per gallon (mpg)?

\_\_\_\_\_ 20. What is the probability that this type of car exceeds 37.3mpg?

\_\_\_\_\_ 21. Only 1.5% of the time this type of car has fuel consumption that is less than how many miles per gallon (mpg)?

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

(4 points each)

Assume 400 observations were randomly drawn from a population of investment returns with a mean of 65 dollars and a standard deviation of 50 dollars. 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. Only 0.25% (or 0.0025) of the sample means that result from the above sampling situation will be less than what value?

\_\_\_\_\_ 25. What is the probability that the sample mean that results from the above situation will be between 66.25 and 70.5?