

STATISTICS 2023

NAME, PRINT IN INK _____

EXAM TWO

SIGNATURE, IN INK _____

FALL 2008

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. A discrete random variable, such as the number of successes in n trials, only has probability on intervals of values and no probability at all on specific values.

_____ 2. If X is a continuous random variable and x_0 is a constant in the range of possible values for X , then the probability $P(X=x_0)$ is 0.

_____ 3. A probability density function represents probability with height in the graph in the same way as a probability mass function represents probability.

_____ 4. The Binomial, like the Poisson distribution, is a right skewed distribution regardless of the values of the parameter.

_____ 5. When a continuous variable has a uniform distribution then the probability is equal for any interval of values of the same length within the range of possible values.

_____ 6. The sampling distribution of the sample mean has a larger variance than the variance of the population from which the sample was drawn.

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

(4 points each)

_____ 7. Find $z_{0.1660}$, that is, find z_0 if $P(Z > z_0) = 0.1660$.

_____ 8. Find the $P(Z < -0.55)$.

_____ 9. What does the $P(-1.24 < Z < -0.52)$ equal?.

_____ 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 0.0188, what is the expected winning amount in this lottery game? Round your answer to two digits past the decimal since the answer is in dollars.

_____ 11. Assume that fifteen percent of the files in a certain computer system are contaminated with a computer virus, called VIRO. If you choose twenty 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 1.2 errors per hour, then what is the probability of at most 4 errors in one hour? State your answer with four digits past the decimal.

The amount of blood needed at a major hospital during each twenty-four hour period is uniformly distributed between the values of 900 pints and 2,000 pints. Use this information to answer the next three questions.

_____ 14. What is the expected number of pints 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 the 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 yearly return on a money market fund is normally distributed with a mean of 1.75% and a standard deviation of .5%. Use this information to answer the questions on this page.

_____ 17. Ninety-seven and one-half percent of the yearly returns on this money market are below what value?

_____ 18. What is the probability that the yearly return will exceed 2%?

_____ 19. What is the probability that the yearly return on this money market is between .5% and 1.5%?

_____ 20. For the variable, X =yearly return on the money market, find the value of x_0 , such that $P(X > x_0) = 0.2946$.

_____ 21. State the interval centered on the mean that contains 95% of the values for the yearly return on the money market. Use the exact Z value, do not use 2.

A field medical device injects patients with a specific amount of fluid, but the process has a slight amount of variation. One setting on the device has a mean injection amount of 1.25ml with a standard deviation of 0.01ml. Assume that samples of 100 observations were repeatedly recorded from this setting on the field medical injection device. Consider the set of all sample means that would result from the repeated sampling process. Use this information to answer all the problems on this page.

_____ 22. What is the numerical value of the mean of the set of all sample means that result from these repeated samples of 100 observations on this medical injection device?

_____ 23. What is the numerical value of the standard deviation of the set of all sample means that result from these repeated samples of 100 observations on this medical injection device?

_____ 24. What is the probability that the sample mean from the repeated samples of 100 observations on this medical injection device will exceed the value 1.25202?

_____ 25. The sample mean of 100 observations from this field medical injection device will be less than what value 1.7% of the time? State your answer with 5 digits past the decimal.