STATISTICS 2023   NAME, PRINT IN INK_____

EXAM TWO   SIGNATURE, IN INK_____

SPRING 2006   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. A discrete random variable is a variable that only has probability on intervals of values and no probability at all on specific values.

_____ 2. A probability density function is a function that indicates how much of the mass of the unit probability is assigned to each value of a discrete random variable.

_____ 3. The standard normal distribution is a symmetric, bell-shaped distribution which always has a standard deviation equal to zero and a mean equal to one.

_____ 4. The Central Limit Theorem states that if the population from which the sample drawn is normally distributed then the sample mean will be normally distributed.

_____ 5. The mean of the sample means, which result from repeated sampling, is always equal to the mean of the population from which the random samples were drawn.

STANDARD NORMAL DISTRIBUTION QUESTIONS.
STATE THE ANSWER State the answer on the line provided.   **(4 points each)**

_____ 6. Find z_o if $P(Z > z_o) = 0.9909$.

_____ 7. Find the $P(1.04 < Z < 2.54)$.

_____ 8. What is the $P(Z > 2.12)$?

STATE THE ANSWER. State the answer on the line given.   (4 points each)

_____ 9. Consider a lottery game in which a person can win $0, $500 or $20,000. If only 5 people out of 35,000 people who play the lottery game win the $20,000 prize and 10 out of the 35,000 win the $500 dollar prize, what is the expected winning in such a lottery game?

_____ 10. Assume that a discrete random variable has five possible values, 50, 60, 70, 80, and 90. If there is 0.05 probability on each of the last two values, 80 and 90, and the remaining probability is divided equally for the other three values of the variable, 50, 60, and 70, then what is the probability that such a random variable is at least the value of 70

_____ 11. Thirty-five percent of the students at the University have at some time received a parking ticket on campus. Out of nine randomly chosen students what is the probability that more than three of them have received a parking ticket on campus? State the answer with four digits past the decimal.

_____ 12. A star basketball player at Oklahoma State University hits 79% of his free throw attempts. If this player is fouled while shooting a three-point basket he would be allowed three free throw attempts. When this player is allowed three free throw attempts what is the probability that he will hit at least one of them? State your answer with six digits past the decimal.

_____ 13. The average number of lightning bugs seen within one hour on any given evening by the lake is 23. What is the probability that you would see 12 lightning bugs during an hour sitting by the lake tomorrow night? Round your answer to five digits past the decimal.

_____ 14. On average there are 1.5 reported thefts on campus each day. What is the probability of at least two thefts in one day if the average is 1.5? State your answer with four digits past the decimal.

STATE THE ANSWER. State the answer on the line given.   (4 points each)
The amount of blood needed at a hospital during each twenty-four hour period is uniformly distributed between the values of 600 pints and 1,600 pints. Use this information to answer the next three questions.

_____ 15. What is the probability that the hospital would need more than 1,400 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 period if they want to have enough blood in storage so that there is only a 5% chance of running out of blood in any twenty-four hour period?

The amount of time a college student spends sleeping each day is normally distributed with a mean of six hours and a standard deviation of 0.8 hours. Use this information to answer the remaining questions on this page.

_____17. Ninety five percent of the time a college student sleeps less than how many hours? State your answers with one digit past the decimal.

_____ 18. What is the probability that a student gets between seven and eight hours of sleep? State your answer with four digits past the decimal.

_____ 19. Only 1.5% of the time a college student sleeps less than how many hours? State your answer with three digits past the decimal.

_____ 20. The thirty-third percentile of sleep times for college students is how many hours long? Round your answer to one digit past the decimal.

STATE THE ANSWER. State the answer on the line given.   (4 points each)

The toxic mineral load in the soil in Pitcher, Oklahoma is very high due to the past lead and zinc mining along Tar creek. Assume a sample of 144 soil observations was randomly drawn from the area around Pitcher. The Environmental Protection Agency (EPA) assumes that the toxic mineral load around Pitcher has a mean of 1,100 units and a standard deviation of 72 units. Use this information to answer the remaining questions.

_____ 21. If the mean toxic mineral load is 1,100 units for the Pitcher area what is the numerical value of the mean of all possible sample means that would result from the above sampling situation?

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

_____ 23. A mean toxic mineral load in the soil that exceeds 1,109 units is very dangerous. What is the probability of observing a sample mean more than the value 1,109 units?

_____ 24. Only 2.5% (or 0.025) of the sample means of toxic mineral load that result from the above sampling situation will be less than what value?

_____ 25. What is the probability that the resulting sample mean will be within two and one-half standard deviations of the overall population mean?