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 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 $P(Z < -0.45)$.

_____ 9. What does the $P(-1.52 < Z < 1.52)$ equal?.

_____ 10. Assume that a discrete random variable has five possible values, 10, 20, 30, 40, and 50. If the probability on each of the first two values, 10 and 20, is 0.05 and the remaining probability is divided equally for the other three values of the variable, 30, 40, and 50, then what is the expected value of such a random variable?

_____ 11. A machine that produces parts for automobile engines is malfunctioning and is producing 15% defectives. If 9 randomly chosen parts are tested, what is the probability that no more than 2 parts are defective? State your answer with 4 digits past the decimal.

_____ 12. A lawyer wins 36% of the cases in which she represents a defendant. If the lawyer is presently representing 8 defendants, what is the probability that 5 of the cases will be won? Round your answer to five digits past the decimal.

_____ 13. On average there are 1.8 sales at the main check-out counter in a certain ice cream parlor each minute. What is the probability of at most one sale at the counter in one minute? State your answer with 4 digits past the decimal.

_____ 14. The mean number of cancelled flights per hour at Dallas Fort Worth International Airport (DFW) is 3.8. What is the probability of 4 or 5 cancelled flights in one hour? Round your answer to five digits past the decimal.

_____ 15. Assume that the profit on a risky stock is a normally distributed random variable with a mean of 22% and a standard deviation of 18%. What is the probability of at least breaking even on a stock whose profit has that probability distribution?

STATE THE ANSWER. State the answer on the line given.   (4 points each)
The amount of sand needed by the university for sanding the sidewalks and the parking lots after a winter ice storm is uniformly distributed between the values of 5 tons and 9 tons. Use this information to answer the next two questions.

_____ 16. What is the probability that the university will need between 6.8 and 7.6 tons of sand for sanding the sidewalks and parking lots after a winter ice storm?

_____ 17. In order to be prepared for ice storm management the university stock piles sand during the winter months for sanding the sidewalks and the parking lots. How many tons of sand should the University have in stock if the Physical Plant only wants a 15% chance of running out after a winter ice storm?

The cost of an accounting analysis for a certain type of small business is a normally distributed random variable with a mean of $12,400 and a standard deviation of $1,375. Use this information to answer the next four questions.

_____18. Half of the time the cost of the accounting analysis for this type of small business exceeds what value?

_____ 19. If the distribution of the cost is as described above what is the probability that the cost of this type of accounting analysis is between $11,162.50 and $14,558.75?

_____ 20. If the distribution of the cost of the accounting analysis is as described above what is the probability of the cost exceeding $13,775 but being less than $14,600?

_____ 21. If the distribution of the cost of the accounting analysis is as described above, then 33% of the time the cost of the accounting analysis is more than how much?

STATE THE ANSWER. State the answer on the line given.   (4 points each)
Very tight quality control must be exercised by a manufacturer of stainless steels bolts. Quality stainless steel bolts sold with a stated length of .5" must be very close to that specific length. In an effort to maintain quality control in the manufacturing plant 400 bolts are randomly chosen from the manufacturing line every hour. Assume the length of the bolts being manufactured has a mean of 0.5 inch and a standard deviation of .002 inches. Use this information to answer the remaining questions.

_____ 22. What is the numerical value of the mean of the sampling distribution of the sample mean that would result from sampling 400 bolts if the bolts being manufactured are as described above?

_____ 23. What is the probability that the sample mean of the bolt lengths from the samples of size 400 is outside of the interval 0.4998 inches to 0.50025 inches?

_____ 24. Only 2.5% of the sample means based on 400 bolt lengths would be more than what length?

_____ 25. What is the probability that the sample mean that results from the above situation will exceed 0.5003?