

STATISTICS 2023

NAME, PRINT IN INK _____

EXAM TWO

SIGNATURE, IN INK _____

SPRING 2004

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. The number of children a person has is a continuous random variable.

_____ 2. The Binomial and the Poisson random variables are both discrete random variables.

_____ 3. The area associated with values less than the mean for a normal distribution is always equal to the area associated with the values more than the mean.

_____ 4. The standard normal distribution is a symmetric distribution which always has a mean value of zero and a standard deviation of one.

_____ 5. The variance of the sample mean is equal to the variance of the original population variance.

Z-table Questions. Write your answer on the line

(4 points each)

_____ 6. What does $P(Z > -0.51)$ equal?

_____ 7. What does $P(-1.13 < Z < 0.49)$ equal?

_____ 8. What is z_0 , such that $P(Z < z_0) = 0.1736$?

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

(4 points each)

_____ 9. Assume that a discrete random variable has five possible values $\{1, 2, 3, 5, 15\}$ and each value has the same probability. What is the variance of such a random variable?

_____ 10. In the gambling game Chunk-a-luck, for a \$1 bet, it is possible to win \$1, \$2, or \$3 with respective probabilities 0.30, 0.05, and 0.01. The player wins nothing and the \$1 bet is lost with probability 0.64. What is the expected value of the payoff for this game?

_____ 11. Forty-four percent of all college students plan to vote in the upcoming presidential election. If this percent is correct, then from a random sample of 200 college students, what is the expected number of college students who state that they plan to vote in the upcoming presidential election?

_____ 12. A course that was served in a Chinese vegetarian banquet at a Buddhist temple was a platter of mushrooms. When attempting to pick up a round, slippery mushroom with chopsticks, an American tourist was successful 55% of the time. Assume that the attempts are independent trials. What is the probability that the tourist was successful at picking up fewer than 2 out of 9 mushrooms? State your answer with 4 digits past the decimal.

_____ 13. It is estimated that 12% vouchers examined by the audit staff employed by a branch of the Department of Health and Human Services will contain an error. If 20 vouchers are randomly selected, what is the probability that 2 or more of them will contain an error? Round your answer to **two** digits past the decimal.

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

(4 points each)

_____ 14. Large bakeries typically have fleets of delivery trucks. One such bakery determined that the expected number of delivery truck breakdowns per day is 1.5. The bakery gets behind on deliveries when 3 or more break downs occur in the same day. What is the probability of that happening?

_____ 15. Airline travelers list 'lost luggage' as the second most common travel problem behind 'canceled flights.' Assume that over a 24-hour period, an average of 6.25 travelers complain of lost luggage at New Orleans International Airport. What is the probability that at most one traveler complains of lost luggage in a 24-hour period? Round your answer to **three** digits past the decimal.

(16-18)

Suppose the research department of a steel manufacturer believes that one of the company's rolling machines is producing sheets of steel of varying thickness. The thickness is a uniform random variable with values between 140 and 200 millimeters.

_____ 16. What is the mean thickness of the sheets produced by this machine?

_____ 17. What is the standard deviation of the thickness of the sheets produced by this machine? Round your answer to **two** digits past the decimal.

_____ 18. Sheets with thickness less than 155 millimeters must be scrapped because they are unacceptable to buyers. What is the probability sheets produced by this machine have to be scrapped?

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

(4 points each)

(19-21)

The estimated miles-per-gallon ratings of a class of trucks are normally distributed with a mean of 12.8 and a standard deviation of 1.6.

_____ 19. What is the probability that one of these trucks selected at random would get between 8 and 12 miles per gallon?

_____ 20. Thirty-three percent of these trucks would get more than how many miles per gallon?

_____ 21. 54% of these trucks would get more than 10.72 miles per gallon and less than how many miles per gallon?

(22-25)

A manufacturer of automobile batteries claims that the lengths of life of its best battery has a mean of 54 months and a standard deviation of 5 months. Suppose a consumer group decides to check the claim by purchasing a sample of 100 of these batteries and subjecting them to tests that determine battery life. Use this information to answer the remaining questions.

_____ 22. What is the numerical value of the mean of the sample mean that would result from the above situation?

_____ 23. What is the numerical value of the standard deviation of the sample mean that would result from the above situation?

_____ 24. Only 2.5% of the sample means that result from the above sampling situation will be more than what value?

_____ 25. What is the probability that the sample mean which results from the above situation will be between 53.77 and 54.74?