

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) A bank's loan officer rates applicants for credit. The ratings are normally distributed with a mean of 200 and a standard deviation of 50. If an applicant is randomly selected, find the probability of a rating that is between 200 and 275. 1) _____
A) 0.5 B) 0.9332 C) 0.4332 D) 0.0668
- 2) The weights of college football players are normally distributed with a mean of 200 pounds and a standard deviation of 50 pounds. If a college football player is randomly selected, find the probability that he weighs between 170 and 220 pounds. 2) _____
A) 0.0703 B) 0.3811 C) 0.2257 D) 0.1554
- 3) A baseball player has a batting average of 0.346, so the probability of a hit is 0.346. Assume that his hitting attempts are independent of each other. Assume that the batter gets up to bat 4 times in each game. Estimate the probability that in 50 consecutive games, there are at least 45 games in which the batter gets at least one hit. (Hint: first find the probability that in one game the batter gets at least one hit) 3) _____
A) 0.0643 B) 0.0918 C) 0.0446 D) 0.8171
- 4) The Precision Scientific Instrument Company manufactures thermometers that are supposed to give readings of 0°C at the freezing point of water. Tests on a large sample of these thermometers reveal that at the freezing point of water, some give readings below 0°C (denoted by negative numbers) and some give readings above 0°C (denoted by positive numbers). Assume that the mean reading is 0°C and the standard deviation of the readings is 1.00°C . Also assume that the frequency distribution of errors closely resembles the normal distribution. A thermometer is randomly selected and tested. A quality control analyst wants to examine thermometers that give readings in the bottom 4%. Find the temperature reading that separates the bottom 4% from the others. 4) _____
A) -1.48° B) -1.75° C) -1.89° D) -1.63°
- 5) Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution. Two percent of hair dryers produced in a certain plant are defective. Estimate the probability that of 10,000 randomly selected hair dryers, at least 219 are defective. 5) _____
A) 0.0934 B) 0.0869 C) 0.0823 D) 0.9066
- 6) Assume that the red blood cell counts of women are normally distributed with a mean of 4.577 million cells per microliter and a standard deviation of 0.382 million cells per microliter. Find the 80th percentile for the red blood cell counts of women. 6) _____
A) 4.655 million cells per microliter
B) 4.878 million cells per microliter
C) 4.898 million cells per microliter
- 7) Estimate the probability of getting exactly 43 boys in 90 births. Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution. 7) _____
A) 0.1628 B) 0.0729 C) 0.0764 D) 0.0159
- 8) For women aged 18-24, systolic blood pressures are normally distributed with a mean of 114.8 mm Hg and a standard deviation of 13.1 mm Hg. If 23 women aged 18-24 are randomly selected, find the probability that their mean systolic blood pressure is between 119 and 122 mm Hg. 8) _____
A) 0.0833 B) 0.9341 C) 0.0577 D) 0.3343

- 9) A study of the amount of time it takes a mechanic to rebuild the transmission for a 2010 Chevrolet Colorado shows that the mean is 8.4 hours and the standard deviation is 1.8 hours. If 40 mechanics are randomly selected, find the probability that their mean rebuild time is less than 8.9 hours. 9) _____
 A) 0.9589 B) 0.9608 C) 0.4276 D) 0.9756
- 10) A coin is tossed 20 times. A person who claims to have extrasensory perception is asked to predict the outcome of each flip in advance. She predicts correctly on 14 tosses. What is the probability of being correct 14 or more times by guessing? Does this probability seem to verify her claim? Use the normal distribution to approximate the desired probability. 10) _____
 A) 0.0582, no B) 0.4418, no C) 0.0582, yes D) 0.4418, yes
- 11) Assume that a sample is used to estimate a population proportion p . Find the margin of error E that corresponds to the given statistics and confidence level. Round the margin of error to four decimal p 11) _____
 98% confidence; the sample size is 800, of which 40% are successes
 A) 0.0446 B) 0.0339 C) 0.0355 D) 0.0404
- 12) Of 380 randomly selected medical students, 21 said that they planned to work in a rural community. Find a 95% confidence interval for the true proportion of all medical students who plan to work in a rural community. 12) _____
 A) $0.0360 < p < 0.0745$ B) $0.0280 < p < 0.0826$
 C) $0.0251 < p < 0.0854$ D) $0.0323 < p < 0.0782$
- 13) Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ . Assume that the population has a normal distribution. 13) _____
 Thirty randomly selected students took the calculus final. If the sample mean was 95 and the standard deviation was 6.6, construct a 99% confidence interval for the mean score of all students.
 A) $92.95 < \mu < 97.05$ B) $91.68 < \mu < 98.32$
 C) $91.69 < \mu < 98.31$ D) $92.03 < \mu < 97.97$
- 14) A survey of 300 union members in New York State reveals that 112 favor the Republican candidate for governor. Construct the 98% confidence interval for the true population proportion of all New York State union members who favor the Republican candidate. 14) _____
 A) $0.316 < p < 0.430$ B) $0.301 < p < 0.445$
 C) $0.304 < p < 0.442$ D) $0.308 < p < 0.438$
- 15) Which critical value is appropriate for a 99% confidence level where $n = 17$; σ is unknown and the population appears to be normally distributed? 15) _____
 A) $z_{\alpha/2} = 2.567$ B) $t_{\alpha/2} = 2.898$ C) $t_{\alpha/2} = 2.921$ D) $z_{\alpha/2} = 2.583$
- 16) If the computed minimum sample size n needed for a particular margin of error is not a whole number, round the value of n _____ (up or down) to the next _____ (smaller or larger) whole number. 16) _____
 A) down; smaller B) down; larger C) up; smaller D) up; larger
- 17) Of 118 randomly selected adults, 34 were found to have high blood pressure. Construct a 95% confidence interval for the true percentage of all adults that have high blood pressure. 17) _____
 A) $20.6\% < p < 37.0\%$ B) $18.1\% < p < 39.6\%$
 C) $19.1\% < p < 38.5\%$ D) $21.9\% < p < 35.7\%$

- 18) A laboratory tested 82 chicken eggs and found that the mean amount of cholesterol was 228 milligrams with $\sigma = 19.0$ milligrams. Construct a 95% confidence interval for the true mean cholesterol content, μ , of all such eggs. 18) _____
- A) $223 \text{ mg} < \mu < 232 \text{ mg}$ B) $225 \text{ mg} < \mu < 233 \text{ mg}$
 C) $224 \text{ mg} < \mu < 232 \text{ mg}$ D) $223 \text{ mg} < \mu < 231 \text{ mg}$
- 19) Use the given data to find the minimum sample size required to estimate the population proportion 19) _____
- Margin of error: 0.028; confidence level: 99%; p and q unknown
 A) 2115 B) 1116 C) 1939 D) 2223
- 20) Do one of the following, as appropriate: (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$. 20) _____
- 99%; $n = 17$; α is unknown; population appears to be normally distributed.
 A) $t_{\sigma/2} = 2.898$ B) $t_{\sigma/2} = 2.921$ C) $z_{\sigma/2} = 2.583$ D) $z_{\sigma/2} = 2.567$
- 21) The margin of error _____ (increases or decreases) with an increased sample size and _____ (increases or decreases) with an increase in confidence level. 21) _____
- A) increases; increases B) decreases; decreases
 C) increases; decreases D) decreases; increases
- 22) Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ . Assume that the population has a normal distribution. 22) _____
- A laboratory tested twelve chicken eggs and found that the mean amount of cholesterol was 185 milligrams with $s = 17.6$ milligrams. Construct a 95% confidence interval for the true mean cholesterol content of all such eggs.
 A) $175.9 \text{ mg} < \mu < 194.1 \text{ mg}$ B) $173.9 \text{ mg} < \mu < 196.1 \text{ mg}$
 C) $173.8 \text{ mg} < \mu < 196.2 \text{ mg}$ D) $173.7 \text{ mg} < \mu < 196.3 \text{ mg}$
- 23) Assume that a sample is used to estimate a population proportion p . Find the margin of error E that corresponds to the given statistics and confidence level. 23) _____
- 95% confidence; $n = 2388$, $x = 1672$
 A) 0.0184 B) 0.0206 C) 0.0248 D) 0.0156
- 24) Find the value of $z_{\alpha/2}$ that corresponds to a confidence level of 89.48%. 24) _____
- A) 1.25 B) -1.62 C) 1.62 D) 0.0526
- 25) Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p . 25) _____
- $n = 195$, $x = 162$; 95% confidence
 A) $0.777 < p < 0.884$ B) $0.789 < p < 0.873$
 C) $0.778 < p < 0.883$ D) $0.788 < p < 0.873$