Provide an appropriate response.

1) In a sample of 10 randomly selected employees, it was found that their mean height was 63.4 inches. From previous studies, it is assumed that the standard deviation, σ, is 2.4. Compute the 95% confidence interval for μ.
   A) (59.7, 66.5)       B) (60.8, 65.4)       C) (61.9, 64.9)       D) (58.1, 67.3)

2) The area under a standard normal density curve with mean of 0 and standard deviation of 1 is infinite
   A) μ +2(3σ)       B) 1       C) μ +3σ       D) infinite

3) An article a Florida newspaper reported on the topics that teenagers most want to discuss with their parents. The findings, the results of a poll, showed that 46% would like more discussion about the family's financial situation, 37% would like to talk about school, and 30% would like to talk about religion. These and other percentages were based on a national sampling of 531 teenagers. Estimate the proportion of all teenagers who want more family discussions about school. Use a 99% confidence level.
   A) 0.37 ± 0.054       B) 0.37 ± 0.002       C) 0.63 ± 0.054       D) 0.63 ± 0.002

4) A senator wishes to estimate the proportion of United States voters who favor abolishing the Electoral College. How large a sample is needed in order to be 95% confident that the sample proportion will not differ from the true proportion by more than 2%?
   A) 25       B) 4802       C) 1692       D) 2401

5) A farmer was interested in determining how many grasshoppers were in his field. He knows that the distribution of grasshoppers may not be normally distributed in his field due to growing conditions. As he drives his tractor down each row he counts how many grasshoppers he sees flying away. After several rows he figures the mean number of flights to be 57 with a standard deviation of 12. What is the probability of the farmer will count 60 or more flights on average in the next 40 rows down which he drives his tractor?
   A) 0.9429       B) 0.4429       C) 0.5710       D) 0.0571

6) Find the critical t- value that corresponds to 99% confidence and n = 10.
   A) 1.833       B) 3.250       C) 2.821       D) 2.262

7) The business college computing center wants to determine the proportion of business students who have personal computers (PC’s) at home. If the proportion exceeds 25%, then the lab will scale back a proposed enlargement of its facilities. Suppose 200 business students were randomly sampled and 65 have PC’s at home. Find the rejection region for this test using α = 0.01.
   A) Reject H₀ if z = 2.33.       B) Reject H₀ if z > 2.33.
   C) Reject H₀ if z < -2.33.       D) Reject H₀ if z > 2.575 or z < -2.575.

8) Many people think that a national lobby’s successful fight against gun control legislation is reflecting the will of a minority of Americans. A random sample of 4000 citizens yielded 2250 who are in favor of gun control legislation. Estimate the true proportion of all Americans who are in favor of gun control legislation using a 90% confidence interval.
   A) 0.4375 ± 0.4048       B) 0.5625 ± 0.4048       C) 0.4375 ± 0.0129       D) 0.5625 ± 0.0129
9) A national caterer determined that 87% of the people who sampled their food said that it was delicious. A random sample of 144 people is obtained from a population of 5000. The 144 people are asked to sample the caterer’s food. Will the distribution of \( \hat{p} \), the sample proportion saying that the food is delicious, be approximately normal? Answer Yes or No.
   A) No  B) Yes

10) Suppose you are using \( \alpha = 0.05 \) to test the claim that \( \mu > 16 \) using a P-value. You are given the sample statistics \( n = 50, \bar{x} = 16.3, \) and \( \sigma = 1.2 \). Find the P-value.
   A) 0.0128  B) 0.0384  C) 0.1321  D) 0.0012

11) Suppose you are using \( \alpha = 0.01 \) to test the claim that \( \mu \leq 20 \) using a P-value. You are given the sample statistics \( n = 40, \bar{x} = 21.8, \) and \( \sigma = 4.3 \). Find the P-value.
   A) 0.9960  B) 0.1030  C) 0.0211  D) 0.0040

12) Scores on a standardized test are normally distributed with a mean of 96 and a standard deviation of 20. An individual’s test score is found to be 102. Find the z-score corresponding to this value.
   A) -3.33  B) -0.30  C) 3.33  D) 0.30

13) Construct a 95% confidence interval for the population mean, \( \mu \). Assume the population has a normal distribution. A sample of 20 part-time workers had mean annual earnings of $3120 with a standard deviation of $677.
   A) ($2803, $3437)  B) ($2135, $2567)  C) ($2657, $2891)  D) ($1324, $1567)

14) The owner of a computer repair shop has determined that their daily revenue has mean $7200 and standard deviation $1200. The daily revenue totals for the next 30 days will be monitored. What is the probability that the mean daily revenue for the next 30 days will exceed $7500?
   A) 0.9131  B) 0.0869  C) 0.0853  D) 0.9147

15) For a standard normal curve, find the z-score that separates the bottom 90% from the top 10%.
   A) 1.28  B) 0.28  C) 2.81  D) 1.52

16) The principal at Riverside High School would like to estimate the mean length of time each day that it takes all the buses to arrive and unload the students. How large a sample is needed if the principal would like to assert with 90% confidence that the sample mean is off by, at most, 7 minutes. Assume \( \sigma = 14 \) minutes.
   A) 11  B) 13  C) 10  D) 12

17) High temperatures in a certain city for the month of August follow a uniform distribution over the interval 60°F to 85°F. What is the probability that a randomly selected August day has a high temperature that exceeded 65°F?
   A) 0.4483  B) 0.2  C) 0.04  D) 0.8

18) Professor Whata Guy surveyed a random sample of 420 statistics students. One of the questions was “Will you take another mathematics class?” The results showed that 252 of the students said yes. What is the sample proportion, \( \hat{p} \) of students who say they will take another math class?
   A) 0.42  B) 0.6  C) 0.775  D) 0.252
19) A national caterer determined that 37% of the people who sampled their food said that it was delicious. A random sample of 144 people is obtained from a population of 5000. The 144 people are asked to sample the caterer’s food. If \( p \) is the sample proportion saying that the food is delicious, what is the standard deviation of the sampling distribution of \( p \)?

A) 0.23  
B) 0.04  
C) 0.002  
D) 0.48

20) The amount of corn chips dispensed into a 16-ounce bag by the dispensing machine has been identified as possessing a normal distribution with a mean of 16.5 ounces and a standard deviation of 0.2 ounce. What chip amount represents the 67th percentile for the bag weight distribution?

A) 16.59 oz  
B) 16.63 oz  
C) 16.13 oz  
D) 16.09 oz

21) A nationwide survey claimed that at least 65% of parents with young children condone spanking their child as a regular form of punishment. In a random sample of 100 parents with young children, how many would need to say that they condone spanking as a form of punishment in order to refute the claim at \( \alpha = 0.5 \)?

A) You would need exactly 57 parents to support spanking to refute the claim.  
B) You would need more than 57 parents to support spanking to refute the claim.  
C) You would need 57 or less parents to support spanking to refute the claim.  
D) You would need 58 or less parents to support spanking to refute the claim.

22) A point estimate is the value of a ______________ that estimates the value of a ______________.

A) random variable; statistic  
B) random variable; parameter  
C) statistic; parameter  
D) parameter; statistic

23) A doctor at a local hospital is interested in estimating the birth weight of infants. How large a sample must she select if she desires to be 98% confident that the true mean is within 2 ounces of the sample mean? The standard deviation of the birth weights is known to be 5 ounces.

A) 6  
B) 5  
C) 34  
D) 33

24) When testing \( H_0: \mu = \mu_0 \), using confidence intervals, if \( \mu \) is not contained in the confidence interval then we would

A) reject \( H_0 \).  
B) draw no conclusion and gather more sample data.  
C) alter the level of confidence to allow \( \mu \) to be in the confidence interval.  
D) fail to reject \( H_0 \).

25) Construct a 95% confidence interval for the population mean, \( \mu \). Assume the population has a normal distribution. A random sample of 16 lithium batteries has a mean life of 645 hours with a standard deviation of 31 hours.

A) (628.5, 661.5)  
B) (531.2, 612.9)  
C) (876.2, 981.5)  
D) (321.7, 365.8)

26) The cell phone conversations of a random sample of 120 students has a standard deviation of 9.7 minutes. Find the margin of error, \( E \), using a 98% confidence interval.

A) 0.19  
B) 2.06  
C) 0.87  
D) 0.89
27) Compare a graph of the normal density function with mean of 0 and standard deviation of 1 with a graph of a normal density function with mean equal to 4 and standard deviation of 1. The graphs would
A) Have the same height but one would be shifted 4 units to the left.
B) Have no horizontal displacement but one would be flatter than the other.
C) Have the same height but one would be shifted 4 units to the right.
D) Have no horizontal displacement but one would be steeper than the other.

28) The standard error of the mean is given by
A) \( \mu - \bar{x} \)
B) \( |\mu - \bar{x}| \)
C) \( \mu \pm \sigma \)
D) \( \frac{\sigma}{\sqrt{n}} \)

29) Find the area under the standard normal curve between \( z = 0 \) and \( z = 3 \).
A) 0.4641
B) 0.9987
C) 0.4987
D) 0.0010

30) The amount of money collected by a snack bar at a large university has been recorded daily for the past five years. Records indicate that the mean daily amount collected is $3250 and the standard deviation is $500. The distribution is skewed to the right due to several high volume days (including football game days). Suppose that 100 days were randomly selected from the five years and the average amount collected from those days was recorded. Which of the following describes the sampling distribution of the sample mean?
A) skewed to the right with a mean of $3250 and a standard deviation of $500
B) normally distributed with a mean of $3250 and a standard deviation of $500
C) normally distributed with a mean of $3250 and a standard deviation of $50
D) normally distributed with a mean of $3250 and a standard deviation of $50

31) A random sample of 40 part-time workers has a mean annual earnings of $3120 and a population standard deviation of $677. Compute the 95% confidence interval for \( \mu \).
A) ($2910, $3330)
B) ($210, $110)
C) ($1987, $2346)
D) ($4812, $5342)

32) A researcher at a major clinic wishes to estimate the proportion of the adult population of the United States that has sleep deprivation. How large a sample is needed in order to be 95% confident that the sample proportion will not differ from the true proportion by more than 5%?
A) 769
B) 271
C) 385
D) 10

33) Suppose a 95% confidence interval for \( \mu \) turns out to be (100, 230). To make more useful inferences from the data, it is desired to reduce the width of the confidence interval. Which of the following will result in a reduced interval width?
A) Increase the sample size and decrease the confidence level.
B) All of these.
C) Decrease the confidence level.
D) Increase the sample size.

Suppose that prices of a certain model of new homes are normally distributed with a mean of $150,000. Find the percentage of buyers who paid:
34) between $147,700 and $152,300 if the standard deviation is $2300.
A) 99.7%
B) 34%
C) 95%
D) 68%
A random variable $X$ is normally distributed with $\mu = 60$. Convert the value of $X$ to a z-score, if the standard deviation is as given.

35) $X = 72; \sigma = 8$

A) 12  B) 8  C) 1.5  D) $\frac{15}{2}$