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

Solve the problem.
1) A 95% confidence interval for the average salary of all CEOs in the electronics industry was constructed using the results of a random survey of 45 CEOs. The interval was ($97,911, $110,014). 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) Decrease the sample size and decrease the confidence level.
B) Increase the sample size and increase the confidence level.
C) Increase the sample size and decrease the confidence level.
D) Decrease the sample size and increase the confidence level.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.
2) Sales of a new line of athletic footwear are crucial to the success of a company. The company wishes to estimate the average weekly sales of the new footwear to within $200 with 95% reliability. The initial sales indicate that the standard deviation of the weekly sales figures is approximately $1500. How many weeks of data must be sampled for the company to get the information it desires?

3) A random sample of 4000 U.S. 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 99% confidence interval.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.
4) A computer package was used to generate the following printout for estimating the mean sale price of homes in a particular neighborhood.

\[ X = \text{sale\_price} \]

\[
\begin{align*}
\text{SAMPLE MEAN OF X} &= 46,600 \\
\text{SAMPLE STANDARD DEV} &= 13,747 \\
\text{SAMPLE SIZE OF X} &= 15 \\
\text{CONFIDENCE} &= 98 \\
\text{UPPER LIMIT} &= 55,913.80 \\
\text{SAMPLE MEAN OF X} &= 46,600 \\
\text{LOWER LIMIT} &= 37,286.20
\end{align*}
\]

A friend suggests that the mean sale price of homes in this neighborhood is $51,000. Comment on your friend’s suggestion.
A) Your friend is correct, and you are 98% certain.
B) Your friend is correct, and you are 100% certain.
C) Based on this printout, all you can say is that the mean sale price might be $51,000.
D) Your friend is wrong, and you are 98% certain.
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

5) A random sample of 250 students at a university finds that these students take a mean of 15.7 credit hours per quarter, but the population standard deviation is 1.8 credit hours. Estimate the mean credit hours taken by a student each quarter using a 98% confidence interval.

6) What is $z_{\alpha/2}$ when $\alpha = 0.06$?

7) How much money does the average professional football fan spend on food at a single football game? That question was posed to 10 randomly selected football fans. The sample results provided a sample mean and standard deviation of $18.00 and $2.50, respectively. Use this information to construct a 99% confidence interval for the mean.

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

8) A 99% confidence interval for the average salary of all CEOs in the electronics industry was constructed using the results of a random survey of 45 CEOs. The interval was ($126,809, $141,094). Give a practical interpretation of the interval.

   A) We are 99% confident that the mean salary of the sampled CEOs falls in the interval $126,809 to $141,094.
   B) We are 99% confident that the mean salary of all CEOs in the electronics industry falls in the interval $126,809 to $141,094.
   C) 99% of the sampled CEOs have salaries that fell in the interval $126,809 to $141,094.
   D) 99% of all CEOs in the electronics industry have salaries that fall between $126,809 to $141,094.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

9) What is the confidence level of the following confidence interval for $\mu$?

$$\bar{x} \pm 2.575\left(\frac{\sigma}{\sqrt{n}}\right)$$

10) A confidence interval was used to estimate the proportion of statistics students who are female. A random sample of 72 statistics students generated the following confidence interval: (.438, .642). Using the information above, what sample size would be necessary if we wanted to estimate the true proportion to within 3% using 95% reliability?

11) The director of a hospital wishes to estimate the mean number of people who are admitted to the emergency room during a 24-hour period. The director randomly selects 100 different 24-hour periods and determines the number of admissions for each. For this sample, $\bar{x} = 16.3$ and the population variance is 16. Estimate the mean number of admissions per 24-hour period with a 99% confidence interval.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

12) What type of car is more popular among college students, American or foreign? One hundred fifty-nine college students were randomly sampled and each was asked which type of car he or she prefers. A computer package was used to generate the printout below of a 90% confidence interval for the proportion of college students who prefer American automobiles.

\[
\text{SAMPLE PROPORTION} = .396 \\
\text{SAMPLE SIZE} = 159 \\
\text{UPPER LIMIT} = .460 \\
\text{LOWER LIMIT} = .332
\]

Based on the interval above, do you believe that 53% of all college students prefer American automobiles?

A) No, and we are 90% confident of it.  B) No, and we are 100% sure of it.
C) Yes, and we are 90% confident of it.  D) Yes, and we are 100% sure of it.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

13) A 90% confidence interval for the mean percentage of airline reservations being canceled on the day of the flight is (1.6%, 5.3%). What is the point estimator of the mean percentage of reservations that are canceled on the day of the flight?

14) The following random sample was selected from a normal population: 9, 11, 8, 10, 14, 8. Construct a 95% confidence interval for the population mean \( \mu \).

15) A random sample of 50 employees of a large company was asked the question, “Do you participate in the company’s stock purchase plan?” The answers are shown below.

\[
\begin{array}{cccccccc}
\text{yes} & \text{no} & \text{no} & \text{yes} & \text{no} & \text{no} & \text{yes} & \text{no} & \text{no} \\
\text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{no} & \text{yes} & \text{no} & \text{yes} \\
\text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{no} & \text{yes} & \text{no} & \text{yes} \\
\text{yes} & \text{no} & \text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{no} & \text{yes} \\
\text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{yes} \\
\text{no} & \text{yes} & \text{yes} & \text{no} & \text{yes} & \text{yes} & \text{yes} & \text{yes} & \text{yes} \\
\end{array}
\]

Use a 90% confidence interval to estimate the proportion of employees who participate in the company’s stock purchase plan.

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

16) A university dean is interested in determining the proportion of students who receive some sort of financial aid. Rather than examine the records for all students, the dean randomly selects 200 students and finds that 118 of them are receiving financial aid. The 95% confidence interval for \( p \) is 59 \( \pm .07 \). Interpret this interval.

A) We are 95% confident that between 52% and 66% of the sampled students receive some sort of financial aid.
B) We are 95% confident that 59% of the students are on some sort of financial aid.
C) 95% of the students receive between 52% and 66% of their tuition in financial aid.
D) We are 95% confident that the true proportion of all students receiving financial aid is between .52 and .66.
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

17) A marketing research company is estimating which of two soft drinks college students prefer. A random sample of \( n \) college students produced the following 90% confidence interval for the proportion of college students who prefer drink A: (.406, .586). Identify the point estimate for estimating the true proportion of college students who prefer that drink.

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

18) A marketing research company is estimating the average total compensation of CEOs in the service industry. Data were randomly collected from 18 CEOs and the 99% confidence interval for the mean was calculated to be ($2,181,260, $5,836,180). What would happen to the confidence interval if the confidence level were changed to 98%?

A) There would be no change in the width of the interval.
B) It is impossible to tell until the 98% interval is constructed.
C) The interval would get wider.
D) The interval would get narrower.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

19) Sales of a new line of athletic footwear are crucial to the success of a newly formed company. The company wishes to estimate the average weekly sales of the new footwear to within $350 with 98% reliability. The initial sales indicate that the standard deviation of the weekly sales figures is approximately $1575. How many weeks of data must be sampled for the company to get the information it desires?