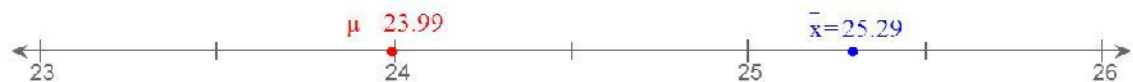1.   Given the same sample statistics, which level of confidence would produce the widest confidence interval?

Choose the correct answer below.

○A. 98%

○B. 90%

○C. 95%

○D. 99%

2.   Use the values on the number line to find the sampling error.

The sampling error is ☐.

3.   Find the margin of error for the given values of c, s, and n.

$c = 0.95$, $s = 3.6$, $n = 36$

E = ☐
(Round to three decimal places as needed.)

4.   Construct the confidence interval for the population mean μ.

$c = 0.90$, $\overline{x} = 9.2$, $s = 0.2$, and $n = 53$

A 90% confidence interval for μ is (☐ , ☐). (Round to two decimal places as needed.)

5.   Construct the confidence interval for the population mean μ.

$c = 0.98$, $\overline{x} = 15.7$, $s = 2.0$, and $n = 60$

A 98% confidence interval for μ is (☐ , ☐). (Round to one decimal place as needed.)

6.   Use the confidence interval to find the estimated margin of error. Then find the sample mean.

A biologist reports a confidence interval of $(3.7, 5.1)$ when estimating the mean height (in centimeters) of a sample of seedlings.

The estimated margin of error is ☐.

The sample mean is ☐.

7.   Find the minimum sample size n needed to estimate μ for the given values of c, s, and E.

$c = 0.95$, $s = 6.9$, and $E = 2$

Assume that a preliminary sample has at least 30 members.

$n = $ ☐ (Round up to the nearest whole number.)

8. You are given the sample mean and the sample standard deviation. Use this information to construct the 90% and 95% confidence intervals for the population mean. Interpret the results and compare the widths of the confidence intervals. If convenient, use technology to construct the confidence intervals.

A random sample of 50 home theater systems has a mean price of $125.00 and a standard deviation is $18.70.

Construct a 90% confidence interval for the population mean.

The 90% confidence interval is (☐ , ☐).
(Round to two decimal places as needed.)

Construct a 95% confidence interval for the population mean.

The 95% confidence interval is (☐ , ☐).
(Round to two decimal places as needed.)

Interpret the results. Choose the correct answer below.

○ A. With 90% confidence, it can be said that the population mean price lies in the first interval. With 95% confidence, it can be said that the population mean price lies in the second interval. The 95% confidence interval is narrower than the 90%.

○ B. With 90% confidence, it can be said that the sample mean price lies in the first interval. With 95% confidence, it can be said that the sample mean price lies in the second interval. The 95% confidence interval is wider than the 90%.

○ C. With 90% confidence, it can be said that the population mean price lies in the first interval. With 95% confidence, it can be said that the population mean price lies in the second interval. The 95% confidence interval is wider than the 90%.

9. You are given the sample mean and the sample standard deviation. Use this information to construct the 90% and 95% confidence intervals for the population mean. Which interval is wider? If convenient, use technology to construct the confidence intervals.

A random sample of 39 gas grills has a mean price of $641.70 and a standard deviation of $56.80.

The 90% confidence interval is (☐ , ☐). (Round to one decimal place as needed.)

The 95% confidence interval is (☐ , ☐). (Round to one decimal place as needed.)

Which interval is wider? Choose the correct answer below.

○ The 95% confidence interval

○ The 90% confidence interval

10. You are given the sample mean and the sample standard deviation. Use this information to construct the 90% and 95% confidence intervals for the population mean. Which interval is wider? If convenient, use technology to construct the confidence intervals.

A random sample of 32 eight-ounce servings of different juice drinks has a mean of 75.1 calories and a standard deviation of 45.2 calories.

The 90% confidence interval is (☐ , ☐). (Round to one decimal place as needed.)

The 95% confidence interval is (☐ , ☐). (Round to one decimal place as needed.)

Which interval is wider?

○ The 90% confidence interval

○ The 95% confidence interval

11. People were polled on how many books they read the previous year. How many subjects are needed to estimate the number of books read the previous year within one book with 90% confidence? Initial survey results indicate that $\sigma = 12.4$ books.

A 90% confidence level requires ☐ subjects.
(Round up to the nearest whole number as needed.)

12. A doctor wants to estimate the HDL cholesterol of all 20- to 29-year-old females. How many subjects are needed to estimate the HDL cholesterol within 4 points with 99% confidence assuming $\sigma = 19.1$? Suppose the doctor would be content with 90% confidence. How does the decrease in confidence affect the sample size required?

A 99% confidence level requires ☐ subjects.
(Round up to the nearest whole number as needed.)

A 90% confidence level requires ☐ subjects.
(Round up to the nearest whole number as needed.)

How does the decrease in confidence affect the sample size required?

○A. The lower the confidence level the smaller the sample size.

○B. The lower the confidence level the larger the sample size.

○C. The sample size is the same for all levels of confidence.

13. Construct the indicated confidence interval for the population mean μ using (a) a t-distribution. (b) If you had incorrectly used a normal distribution, which interval would be wider?

$c = 0.95, \ \overline{x} = 12.2, \ s = 4.0, \ n = 5$

(a) The 95% confidence interval using a t-distribution is (☐ , ☐).
(Round to one decimal place as needed.)

(b) If you had incorrectly used a normal distribution, which interval would be wider?

○ The normal distribution has the wider interval.

○ The t-distribution has the wider interval.

14. In the following situation, assume the random variable is normally distributed and use a normal distribution or a t-distribution to construct a 90% confidence interval for the population mean. If convenient, use technology to construct the confidence interval.

(a) In a random sample of 10 adults from a nearby county, the mean waste generated per person per day was 3.69 pounds and the standard deviation was 1.07 pounds.
(b) Repeat part (a), assuming the same statistics came from a sample size of 450. Compare the results.

(a) For the sample of 10 adults, the 90% confidence interval is ([ ],[ ]).
(Round to two decimal places as needed.)

(b) For the sample of 450 adults, the 90% confidence interval is ([ ],[ ]).
(Round to two decimal places as needed.)

Choose the correct observation below.

○A. The interval from part (a), which uses the t-distribution, is narrower than the interval from part (b), which uses the normal distribution.

○B. The interval from part (a), which uses the normal distribution, is narrower than the interval from part (b), which uses the t-distribution.

○C. The interval from part (a), which uses the normal distribution, is wider than the interval from part (b), which uses the t-distribution.

○D. The interval from part (a), which uses the t-distribution, is wider than the interval from part (b), which uses the normal distribution.

15. Use the given confidence interval to find the margin of error and the sample proportion.

(0.643, 0.673)

$E =$ [ ] (Type an integer or a decimal.)

$\hat{p} =$ [ ] (Type an integer or a decimal.)

16. In a survey of 626 males ages 18-64, 397 say they have gone to the dentist in the past year.

Construct 90% and 95% confidence intervals for the population proportion. Interpret the results and compare the widths of the confidence intervals. If convenient, use technology to construct the confidence intervals.

The 90% confidence interval for the population proportion p is (☐ , ☐).
(Round to three decimal places as needed.)

The 95% confidence interval for the population proportion p is (☐ , ☐).
(Round to three decimal places as needed.)

Interpret your results of both confidence intervals.

○A. With the given confidence, it can be said that the sample proportion of males ages 18-64 who say they have gone to the dentist in the past year is between the endpoints of the given confidence interval.

○B. With the given confidence, it can be said that the population proportion of males ages 18-64 who say they have gone to the dentist in the past year is not between the endpoints of the given confidence interval.

○C. With the given confidence, it can be said that the population proportion of males ages 18-64 who say they have gone to the dentist in the past year is between the endpoints of the given confidence interval.

Which interval is wider?

○ The 90% confidence interval

○ The 95% confidence interval

17. In a survey of 9000 women, 6431 say they change their nail polish once a week. Construct a 99% confidence interval for the population proportion of women who change their nail polish once a week.

A 99% confidence interval for the population proportion is (☐ , ☐).
(Round to three decimal places as needed.)

18. A researcher wishes to estimate, with 99% confidence, the proportion of adults who have high-speed Internet access. Her estimate must be accurate within 3% of the true proportion.
a) Find the minimum sample size needed, using a prior study that found that 56% of the respondents said they have high-speed Internet access.
b) No preliminary estimate is available. Find the minimum sample size needed.

a) What is the minimum sample size needed using a prior study that found that 56% of the respondents said they have high-speed Internet access?

$n = \boxed{}$ (Round up to the nearest whole number as needed.)

b) What is the minimum sample size needed assuming that no preliminary estimate is available?

$n = \boxed{}$ (Round up to the nearest whole number as needed.)

19. The table to the right shows the results of a survey in which 2553 adults from Country A, 1135 adults from Country B, and 1096 adults from Country C were asked if human activity contributes to global warming. Complete parts (a), (b), and (c).

Adults who say that human activity contributes to global warming	
Country A	64%
Country B	86%
Country C	93%

(a) Construct a 95% confidence interval for the proportion of adults from Country A who say human activity contributes to global warming.

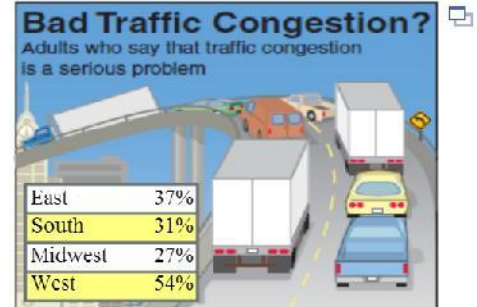$(\boxed{}, \boxed{})$ (Round to three decimal places as needed.)

(b) Construct a 95% confidence interval for the proportion of adults from Country B who say human activity contributes to global warming.

$(\boxed{}, \boxed{})$ (Round to three decimal places as needed.)

(c) Construct a 95% confidence interval for the proportion of adults from Country C who say human activity contributes to global warming.

$(\boxed{}, \boxed{})$ (Round to three decimal places as needed.)

20.

The table shows the results of a survey in which separate samples of 400 adults each from the East, South, Midwest, and West were asked if traffic congestion is a serious problem in their community. Complete parts (a) and (b).

Bad Traffic Congestion?
Adults who say that traffic congestion is a serious problem

East	37%
South	31%
Midwest	27%
West	54%

(a) Construct a 95% confidence interval for the proportion of adults from the Midwest who say traffic congestion is a serious problem.

The 95% confidence interval for the proportion of adults from the Midwest who say traffic congestion is a serious problem is (⬚ , ⬚).
(Round to three decimal places as needed.)

(b) Construct a 95% confidence interval for the proportion of adults from the South who say traffic congestion is a serious problem.

The 95% confidence interval for the proportion of adults from the South who say traffic congestion is a serious problem is (⬚ , ⬚).
(Round to three decimal places as needed.)