1. Find the critical value $z_{\alpha/2}$ that corresponds to an 85% confidence level.

2. Use the given confidence interval limits to find the point estimate $\hat{p}$ and the margin of error $E$.

\[0.772 < p < 0.776\]

3. Assume that a random sample is used to estimate a population proportion $p$. Find the margin of error $E$ that corresponds to the given statistics and confidence level.

\[n = 500, x = 220, 99\% \text{ confidence}\]

4. The Genetics and IVF Institute conducted a clinical trial of the XSORT method designed to increase the probability of conceiving a girl. As of this writing, 574 babies were born to parents using the XSORT method, and 525 of them were girls.

   a. What is the best point estimate of the population proportion of girls born to parents using the XSORT method?
   
   b. Use the sample data to construct a 95% confidence interval estimate of the percentage of girls born to parents using the XSORT method.
   
   c. Based on the results, does the XSORT method appear to be effective? Why or why not?

5. Use the given degree of confidence and sample data to construct a confidence interval for the population proportion $p$. Round to three decimal places.

   In a survey of 1002 people, 701 said that they voted in a recent presidential election (based on data from ICR Research Group). Construct the 99% confidence interval estimate of the proportion of people who say that they voted.

6. As the newly hired manager of a company that provides cell phone service, you want to determine the percentage of adults in your state who live in a household with cell phones and no land-line phones. How many adults must you survey? Assume that you want to be 90% confident that the sample percentage is within four percentage points of the true population percentage.

7. Use the given data to find the minimum sample size required to estimate the population proportion.

   Margin of error: two percentage points; confidence level: 99%; from a prior study, $\hat{p}$ is estimated by the decimal equivalent of 14%.

8. Using the simple random sample of weights of women from a data set, we obtain these sample statistics: $n = 40$ and $\bar{x} = 146.22$ lb. Research from other sources suggests that the population of weights of women has a standard deviation given by $\sigma = 30.86$ lb.

   a. Find the best point estimate of the mean weight of all women.

   b. Find a 95% confidence interval estimate of the mean weight of all women.
9. A simple random sample of 50 adults (including males and females) is obtained, and each person’s red blood cell count (in cells per microliter) is measured. The sample mean is 4.63. The population standard deviation for red blood cell counts is 0.54.
   a. Construct a 99% confidence interval estimate of the mean red blood cell count of adults.
   b. The normal range of red blood cell counts for adults is given by the National Institutes of Health as 4.7 to 6.1 for males and 4.3 to 5.4 for females. What does the confidence interval suggest about these normal ranges?

10. A simple random sample of 40 salaries of NCAA football coaches has a mean of $415,953. Assume that $\sigma = $463,364. Construct a 95% confidence interval estimate of the mean salary of an NCAA Football coach.

11. How many adults must be randomly selected to estimate the mean FICO (credit rating) score of working adults in the United States? We want 95% confidence that the sample mean is within 3 points of the population mean, and the population standard deviation is 68.

12. A simple random sample of 125 SAT scores has a mean of 1522. Assume that SAT scores have a standard deviation of 333. Construct a 95% confidence interval estimate of the mean SAT score.

13. A simple random sample of 37 weights of pennies made after 1983 has a mean of 2.4991 g and a standard deviation of 0.0165 g. Construct a 99% confidence interval estimate of the mean weight of all such pennies.

14. Find the sample size required to estimate the mean age of registered drivers in the United States. Assume that we want 95% confidence that the sample mean is within ½ year of the true mean age of the population. Also assume that the standard deviation of the population is known to be 12 years.

15. Do one of the following, as appropriate. (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.
   
   Confidence level 95%; $n = 23$; $\sigma$ is unknown; population appears to be normally distributed.

16. Use the given confidence level and sample data to find the following information. Assume that the population has a normal distribution.
   
   Hospital costs for car crash victims who wore seat belts: 95% confidence; $n = 20$, $\bar{x} = $9004, $s = $569
   a. The margin of error.
   b. The confidence interval for the population mean $\mu$.

17. Do one of the following, as appropriate. (a) Find the critical value $z_{\alpha/2}$, (b) find the critical value $t_{\alpha/2}$, (c) state that neither the normal nor the t distribution applies.
   
   Confidence level 90%; $n = 200$; $\sigma = 15.0$; population appears to be skewed.

18. Twelve different video games showing substance use were observed and the duration times of game play (in seconds) are listed below. The design of the study justifies the assumption that the sample can be treated as a
simple random sample. Use the sample data to construct a 95% confidence interval estimate of \( \mu \), the mean duration of game play.

4049  3884  3859  4027  4318  4813  4657  4033  5004  4334  4317  4823

19. Listed below are weights (in pounds) of glass discarded in one week by randomly selected households (based on data from the Garbage Project at the University of Arizona). Construct a 95% confidence interval estimate of the mean weight of glass discarded by all households.

3.52  8.87  3.99  3.61  2.33  3.21  0.25  4.94