Chapter 8 Review Sheet

1. If the 90% confidence interval of the mean of a population is given by 45 ± 3.24, which of the following is correct?
   (a) There is a 90% probability that the true mean is in the interval.
   (b) There is a 90% probability that the sample mean is in the interval.
   (c) If 1,000 samples of the same size are taken from the population and a confidence interval is constructed around the mean of each sample, then approximately 900 of the confidence intervals will contain the true mean.
   (d) There is a 90% probability that a data value, chosen at random, will fall in this interval.
   (e) None of the above.

2. Which of the following statements about confidence intervals is not correct?
   (a) If the sample size were to increase the width of the interval would decrease.
   (b) An increase in confidence level results in an increase in the width of the confidence interval.
   (c) A confidence interval can be calculated after either a sample or a census is conducted.
   (d) If one would like a smaller confidence interval, one could increase the sample size or decrease the confidence level.
   (e) All of these are correct.

3. The choice between a z-interval and a t-interval for a population mean depends primarily on:
   (a) The sample size.
   (b) The confidence level.
   (c) Whether it uses means or proportions.
   (d) Whether the given standard deviation is from the population or the sample.
   (e) A z-test should never be used.

4. The college newspaper of a large Midwestern university periodically conducts a survey of students on campus to determine the attitude on campus concerning issues of interest. Pictures of the students interviewed along with quotes of their responses are printed in the paper. A reporter interviews five of her friends and asks them if they feel there is adequate student parking on campus. Four of the students say no. Which of the following conditions for inference about a proportion using a confidence interval are violated in this example?

   I. The data are selected randomly from the population of interest.
   II. The population is at least ten times as large as the sample.
   III. $n\hat{p} \geq 10$ and $n(1-\hat{p}) \geq 10$.

   (a) I only
   (b) I and II
   (c) I and III
   (d) I, II and III
   (e) III only

5. A polling organization announces that the proportion of American voters who favor congressional term limits is 64 %, with a 95% confidence margin of error of 3 %. This means that
   (a) If the poll were conducted again in the same way, there is a 95% chance that the fraction of voters favoring term limits in the second poll would be between 61 % and 67 %.
   (b) There is a 95% probability that the true percentage of voters favoring term limits is between 61 and 67%.
   (c) If the poll were conducted again the same way, there is a 95% probability that the percentage of voters favoring term limits in the second poll would be within 3 % of the percentage favoring term limits in the first poll.
   (d) Among 95% of the voters, between 61 % and 67 % favor term limits.
   (e) We are reasonably certain that the true proportion of voters favoring term limits is between 61% and 67%.

6. Will the results from t procedures always, sometimes, or never be valid:

   When the sample is not selected randomly?

   When the sample size is small?

   When the distribution of the population is skewed?

   When there are outliers in the distribution of the sample data?

7. Suppose the heights of eighth grade girls are known to be Normally distributed. A sample of 23 eighth grade girls from Lake Wobegon is randomly selected, their heights are recorded, and then a 95% confidence interval for the average height of all eighth grade girls in Lake Wobegon is calculated. Sample data is shown in the table below.

Variable	N	Mean	StDev	SE Mean	95.0 % CI
Heights	23	62.345	?	?	(60.00, 64.69)

   Find the standard deviation of the sample.

8. A simple random sample of 100 eighth graders at a large suburban middle school indicated that 83% of them are involved with some type of after-school activity. What is the standard error of this estimate?

9. A very selective college claims that the mean GPA of its undergraduates is 3.125. A random sample of 64 of their undergraduates indicates a mean of 2.987 with a standard deviation of .305. What is the standard error of the sample mean?

10. We want to estimate the proportion of students who favor a four-day school week during May and June.
    a) What sample size would be required to create a margin of error of no more than 2% with 90% confidence?

    b) Recalculate the sample size required in part (a) using the fact that earlier studies have indicated the proportion of students favoring a four-day week is approximately 85%.

11. Durations of 74 storms in the Tampa Bay area are reported in a 2002 study. The mean is 75.7 min. The population standard deviation is 60.7 min.

    a) How many storms would the study have to include so that your confidence interval had a margin of error of no more than 10 min with 95% confidence?

    b) Construct and interpret a 95% confidence interval for the mean duration of storms in the Tampa Bay area. Assume the conditions for inference are met.

12. A simple random sample of 101 students at Washburn High School is taken. The mean grade point average of the sample (on a 4-point scale) was 3.12 with a standard deviation of 0.35. Construct and interpret a 95% confidence interval for the mean grade point average of all Washburn students.

13. A newspaper headline proclaimed "Most U.S. Catholics want changes in policies of Catholicism." The article was a report of a Gallup Poll based on random interviews with 264 U.S. Catholics. 150 of those interviewed favor changing the Catholic church's policies. Construct and interpret a 95% confidence interval for the proportion of all U.S. Catholics who want change.

Chapter 8 Learning Targets:

__ I can explain what statistical inference is.

__ I can identify the estimate and margin of error in a confidence interval.

__ I can explain what “95% confidence” (or any other confidence level) means.

__ I can describe how confidence intervals are affected by changes to the confidence level and sample size.

__ I can construct and interpret a one-proportion z interval.

__ I can calculate the sample size required to produce a desired margin of error for a one-proportion z interval.

__ I can construct and interpret a one-sample z interval.

__ I can explain the difference between z and t distributions.

__ I can explain when to use z procedures vs. t procedures.

__ I can use the t table to find critical t* values.

__ I can construct and interpret a one-sample t interval.

__ I can calculate the sample size required to produce a desired margin of error for a one-sample z interval.