Worksheet 10 – Chapter 6 – Hypothesis Testing

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Section: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use DDXL where appropriate for the following problems.

1. One operation of a steel mill is to cut pieces of steel into parts that are used in the frame for front seats in an automobile. The steel is cut with a diamond saw and requires the resulting parts must be cut to be within ± .005 inch of the length specified by the automobile company. The file STEEL contains a sample of 100 randomly selected steel parts. The measurement reported is the difference, in inches, between the actual length of the steel part, as measured by a laser measurement device, and the specified length of the steel part. For example, a value of -0.002 represents a steel part that is 0.002 inch shorter than the specified length.
   1. USE DDXL. At the 0.10 level of significance, is there evidence that the mean difference is not equal to 0.0 inches? (Give all parts for the hypothesis test: hypotheses, assumptions, testing using DDXL, and Summary).
   2. USE DDXL. Construct a 95% confidence interval estimate of the population mean. Interpret this interval. Would it seem reasonable to have a mean difference equal to 0.0 inches? Why?
   3. Compare the conclusions reached in (a) and (b).
2. The file FASTFOOD contains the amount that a random sample of nine customers spent for lunch ($) at a fast-food restaurant.
   1. USE DDXL. At the 0.05 level of significance, is there evidence that the mean amount spent for all customers lunch is more than $5.00? (Give all parts for the hypothesis test: hypotheses, assumptions, testing using DDXL, and Summary).
   2. USE DDXL. Construct a boxplot or a normal probability plot to evaluate the assumptions you made.
   3. Redo the *testing* step for part (a) using the Rejection Region approach. Do you end up with the same conclusions?
3. The US Department of Education reports that 46% of full-time college students are employed while attending college. A recent survey of 60 full-time students at Miami University found that 29 were employed.
   1. USE EXCEL. Create a file that corresponds to the raw sample data described in this problem.
   2. USE DDXL. Use a hypothesis test to determine whether the proportion of full-time students at Miami University that are employed is different from the national norm of 0.46.
   3. If we assume that the study found that 36 out of the 60 full-time students were employed. What parts of part (a) would change? What are those changes? [don’t have to give full test again just the parts that change]
4. Many consumer groups feel that the US Food and Drug Administration (FDA) drug approval process is too easy and, as a result, too many drugs are approved that are later found to be unsafe. On the other hand, a number of industry lobbyists have pushed for a more lenient approval process so that pharmaceutical companies can get new drugs approved more easily and quickly. Consider a null hypothesis that a new, unapproved drug is unsafe and an alternative hypothesis that a new, unapproved drug is safe.
   1. In the context of this problem, explain the risks of committing a Type 1 or Type II error.
   2. Which type of error are the consumer groups trying to avoid? Explain.
   3. Which type of error are the industry lobbyists trying to avoid? Explain.