

1. Energy Consumption: Notation After finding the values of the mean and range for each year, find the values of \bar{x} , and \bar{R} . Then find the values of LCL and UCL for an R chart and find the values of LCL and UCL for an \bar{x} chart.

2. Energy Consumption: R Chart Let each subgroup consist of the 6 values within a year. Construct an R chart and determine whether the process variation is within statistical control. If it is not, identify which of the three out-of-control criteria lead to rejection of statistically stable variation.

3. Energy Consumption: \bar{x} Chart Let each subgroup consist of the 6 values within a year. Construct an \bar{x} chart and determine whether the process mean is within statistical control. If it is not, identify which of the three out-of-control criteria lead to rejection of a statistically stable mean.

4. Energy Consumption: Run Chart Construct a run chart for the 48 values. Does there appear to be a pattern suggesting that the process is not within statistical control?

5. Defective Aspirin Tablets The Acton Pharmaceutical Company manufactures aspirin tablets that are supposed to contain 325 mg of aspirin. Each day, 100 tablets are randomly selected and the amount of aspirin is measured. A tablet is considered defective if it has obvious physical deformities or the amount of aspirin is not between 315 mg and 335 mg. The numbers of defects are listed below for consecutive production days. Construct an appropriate control chart and determine whether the process is within statistical control. If not, identify which criteria lead to rejection of statistical stability.

2 3 3 2 4 6 3 7 8 6 9 7 6 8 10

Cumulative Review Exercises

Please be aware that some of the following problems may require knowledge of concepts presented in previous chapters.

1. Workplace Etiquette: Confidence Interval In a survey conducted by Opinion Research Corporation, randomly selected adults were asked what is inappropriate in the workplace. Among 1000 responses, 55% said that it is inappropriate to wear shorts. Use the sample results to construct a 95% confidence interval estimate of the proportion of the adult population believing that it is inappropriate to wear shorts at work. Based on the result, does it appear that the majority of adults believe that it is not appropriate to wear shorts at work?

2. Workplace Etiquette: Probability Based on the results in Exercise 1, assume that there is a 0.55 probability of randomly selecting an adult and getting someone who believes that it is inappropriate to wear shorts at work.

a. What is the probability of randomly selecting an adult and getting someone who does *not* believe that it is inappropriate to wear shorts at work.

b. If five different adults are randomly selected, what is the probability that they all believe that it is inappropriate to wear shorts at work?

c. If five different adults are randomly selected, what is the probability of getting at least one who does *not* believe that it is inappropriate to wear shorts at work?

3. Agriculture Experiment: Correlation In 1908, William Gosset published the article "The Probable Error of a Mean" under the pseudonym of "Student" (*Biometrika*, Vol. 6, No. 1). He included the data listed below for yields from two different types of seed (regular and kiln dried) that were used on adjacent plots of land. The listed values are the yields of