**Problem 2.5**

The following information is collected from students upon exiting the campus bookstore during the first week of classes:

1. Amount of time spent shopping in the bookstore
2. Number of textbooks purchased
3. Academic major
4. Gender

Classify each of these variables as categorical or numerical. If the variable is numerical, determine whether the variable is discrete or continuous. In addition, determine the level of measurement for each of these variables.

**Problem 2.25**

Each day at large hospital, several hundred laboratory tests are performed. Te rate at which these tests are done improperly (and therefore need to be redone) seems steady, at about 4%. In an effort to get the root cause of these nonconformances, tests that need to be redone, the director of the lab decided to keep records over a period of one week. The laboratory tests were subdivided by the shift of workers who performed the lab tests. The results are as follows:

**LAB TESTS SHIFT**

**PERFORMED Day Evening Total**

**Nonconforming** 16 24 40

**Conforming** 654 306 960

**Total** 670 330 1,000

1. Construct contingency tables based on total percentages, row percentages, and column percentages.
2. Which type of percentage---row, column, or total---do you think is the most is most informative for these data? Explain.
3. What conclusions concerning the pattern of nonconforming laboratory tests can the laboratory director reach?

**Problem 2.35**

A manufacturing company produces electric insulators. If the insulators break when in use, a short circuit is likely to occur. To test the strength of the insulators, destructive testing in high-powered labs is carried out to determine how much *force* is required to break the insulators. Force is measured by observing how many pounds must be applied to insulator before it breaks. Data are collected from sample of 30 insulators. The file **Force** contains the strengths as follows:

1,870 1,728 1,656 1,610 1,634 1,784 1,522 1,696

1,592 1,662 1,866 1,764 1,734 1,662 1,734 1,774

1,550 1,756 1,762 1,866 1,820 1,744 1,788 1,688

1,810 1,752 1,680 1,810 1,652 1,736

1. Construct a frequency distribution and a percentage distribution.
2. Construct a cumulative percentage distribution.
3. What can you conclude about the strength of the insulators if the company requires a force measurement of at least 1,500 pounds before the insulator breaks?

**Problem 2.51**

The file **DarkChocolate** contains the cost per ounce ($), for a sample of 14 dark chocolate bars.

0.68 0.72 0.92 1.14 1.42 0.94 0.77

0.57 1.51 0.57 0.55 0.86 1.41 0.90

**Source:** *Data extracted from “Dark Chocolate: Which Bars Are Best?”*

*Consumer Reports, September 2007,p.8.*

1. Places the data into an ordered array.
2. Construct a stem-and-leaf display
3. Does the ordered array or the stem-and-leaf display provide more information? Discuss.
4. Around What value, if any, is the cost of dark chocolate bars constructed? Explain?

**Problem 2.65**

College football players trying out for the NFL are given the Wonderlic standardize intelligence test The file **Wonderlic** contains the average Wonderlic scores of football players trying out for the NFL and the graduation rate for football players at selected schools (data extracted from S. Walker, “The NFL’s Smartest Team,” The Wall Street Journal, September 30, 2005,pp.W1,W10).

1. Construct a scatter plot with average Wonderlic score on the X axis and graduation rate on the Y axis.
2. What conclusion can you reach about the relationship between the average Wonderlic score and graduation rate?

**Problem 3.11**

The file **Sedans** contains the overall miles per gallon

27 31 30 28 27 24 29 32

32 27 26 26 25 26 25 24

Source: Data extracted from “Vehicle Rating,” Consumer Reports, April 2009, p.27.

1. Compute the mean, median, and mode.
2. Compute the variance, standard deviation, range, coefficient of variation, and Z scores.
3. Are the data skewed? Is so, how?
4. Compute the results of (a) through (c) to those of problem3.12 (2) through (c) that refer to the miles per gallon of SUVs priced under $30,000.

**Problem 3.19**

General Electric (GE) is one of the world’s largest companies; it develops, manufactures, and markets a wide range of products, including medical diagnostic imaging devices, jet engines, lighting products, and chemicals. Through its affiliate, NBC Universal, GE produces and delivers network television and motion pictures. In 2007, GE’s stock stock price rose 2.67%, but in 2008, the price dropped 53.94%.

Source: Data extracted from **finance.yahoo.com**, June 18,2009.

1. Compute the geometric mean rate of increase for the two-year period 2007-2008. (*Hint*: Denote an increase of 2.67% as R1= 0.027.)
2. If you purchased $1,000 of GE stock at the start of 2007, what was its value at the end of 2008?