I. The Five-Steps for Solving Problems

1. **Understand the problem.**
   - Read the problem *carefully* at least twice. In the first reading, get a general overview of the problem. In the second reading, determine (a) exactly what you are being asked to find and (b) what information the problem provides.
   - Make a list of the given facts. Determine which are necessary for solving the problem.
   - Determine whether you can substitute smaller or simpler numbers to make the problem more understandable.
   - If it will help you organize the information, list the information in a table.
   - If possible, make a sketch to illustrate the problem. Label the information given.

2. **Translate the problem into mathematical language.**
   - This will generally involve expressing the problem in terms of an *algebraic expression* (any collection of numbers, letters (called variables), grouping symbols such as parentheses ( ) or brackets [ ], and operations (such as addition, subtraction, multiplication, and division) or an equation.
   - Determine whether there is a formula that can be used to solve the problem.
   - Pay attention to the dimensions of the variables and constants. The variables that represent length should all be in the same unit, those that represent money should all be dollars or all be cents, and so on.

3. **Carry out the mathematical calculations necessary to solve the problem.**

4. **Check the answer obtained in step 3.**
   - Ask yourself, “Does the answer make sense?” “Is the answer reasonable?” If the answer is not reasonable, recheck your method for solving the problem and your calculations.
   - Check the solution in the original problem if possible.

5. **Make sure you have answered the question.**
   - State the answer clearly, in a complete sentence, and don’t forget the units.

**Example 1** A personal chef is preparing dinner for her Chicago client who is on a 1200 calories per-day restricted diet. If the client has already consumed 745 calories, mostly consisting of foods high in protein, how many calories can this client have for dinner?
Example 2  Corey Wiley has two coupons for his local Closets, Kitchens and Things store. One coupon is for $5 off his total purchase and the other is for 20% off a single item. If he can only use one coupon to purchase a $16 mirror and a $5 set of pillow cases,

a) Which coupon will save him the most money?

b) How much will he save?

II. Solving Problems Involving Graphs

Example 3  The bar graph shows the number of steps it takes to burn off calories from a garden salad with fat-free dressing, a 12 ounce can of soda, a doughnut, and a cheeseburger. Use the bar graph to answer the following questions.

a) Estimate the number of steps it takes to burn off the calories from a 12-ounce can of soda.

b) If Cliff Jackson can walk a mile in 2000 steps, how many miles will he have to walk in order to burn off the calories from the 12-ounce can of soda he drank for lunch.

c) If Jenna walks a mile in 2400 steps, how many miles will she have to walk in order to burn off the calories from a doughnut she ate for a morning snack.
Example 4  The breathtaking Australian Hotham Alpine Resort is located in the heart of the Victorian Alps. The line graph below summarizes the monthly snow accumulation in 2002, 2004, and 2006. Use the graph to answer the following questions.

a) During which year was there the most amount of snow accumulation?

b) During which year was there the least amount of snow accumulation?

c) Approximately how much snow accumulated between July and August in 2002?

d) Approximately how much snow accumulated between July and August in 2006?

III. Solving Problems Involving Two Measures of Central Tendency or “Averages”

A measure of central tendency is a single number that can be used to represent a typical piece of data from a set of the data. An example would be your grade at the end of the semester.

1. The Mean (true average): found by adding all the data values and dividing by the number of pieces of data.

2. The Median (another “average”): found by ranking the data and then taking the middle value.

Example 5  Sal Conway’s test grades are 84, 65, 91, 70, and 75. Determine the:

a) mean

b) median
Example 6 Susan Renicke decided to take advantage of her utility company’s budget-billing. U-Lite-It Electric Company will average (calculate the mean of) the previous six bill amounts to determine the new payment with budget billing. Susan’s last six bills were: $67.22, $43.04, $55.67, $89.22, $94.01 and $90.75. For Susan’s bills, determine:

a) the average, or mean

b) the median

c) Susan’s new payment

Example 7 The prices of homes sold in a certain area during the month of June were: $479,000, $587,000, $424,000, $786,000, $525,000 and $2,325,000. Determine:

a) the mean

b) the median

c) Which gives a more accurate representation of home prices in the area?