**Unit 2 Outline**

**Learning Objectives**

Study of this unit should enable the student to

* convert percentages to decimals, decimals to percentages, and fractions to decimals;
* solve percentage problems;
* calculate the area of squares, rectangles, triangles and irregular closed figures;
* convert various units of measure;
* compute the amount of living area in a house;
* compute the volume of triangular prisms;
* define terms used in the study of statistics;
* interpret and analyze statistical data when presented in an array and frequency distribution;
* calculate the mean, median, and mode;
* distinguish between the formula for finding the standard deviation of an entire population and the formula for finding the standard deviation of a sample;
* calculate the range, average deviation, and standard deviation;
* prepare statistical data in the form of tables, bar charts, histograms, and line graphs; and
* describe regression analysis.

**Unit Outline**

I. Overview

II. Calculators—great aid in the real estate business

III. Percentages—percent (%) means per hundred or per hundred parts

A. Converting Percentages to Decimals—move decimal point two places to the left and drop the percent sign

B. Converting Decimals to Percentages—move decimal point two places to the right and add the percent sign

C. Converting Fractions to Decimals—proper fraction is one with numerator less than denominator

**Exercise 2-1**

D. Percentage Problems

1. Generalized formula—Part = Total × Percent

2. Formulas derived from basic formula

a. Total = Part ÷ Percent

b. Percent = Part ÷ Total

E. Problem-Solving Strategy—to solve word problems

1. Read problem carefully

2. Analyze problem—put important factors into simplified question

3. Choose proper formula

4. Substitute figures for the elements of formula

5. Solve problem

## Exercise 2-2

IV. Interest—cost of using someone else's money

A. Simple Interest—based on the original principal, not on the accrued interest—formula for computing: Principal × Rate × Time = Interest

B. Compound Interest—interest is periodically added to the principal and the new balance (principal + interest) draws interest—formula for computing: Principal × (1 + interest rate)n = Future Value

V. Calculating the Functions of One Dollar

A. Six Functions

1. Future value of $1

2. Future value of $1 per period

3. Sinking fund factor

4. Present value of $1

5. Present value of $1 per period

6. Payment to amortize $1

B. HP 12C Financial Calculator—basic functions

**Exercise 2-3**

VI. Area and Volume

A. Area of Squares and Rectangles

1. Area is the space inside a two-dimensional shape

2. Formula: A = L × W

3. Front foot versus area

4. Conversions—using like measures for area—all dimensions used must be given in the same kind of units

## Exercise 2-4

B. Area of Triangles—formula: A = 1/2 (BH)

## Exercise 2-5

C. Area of Irregular Closed Figures

## Exercise 2-6

D. Living Area Calculations—appraisers frequently must compute the amount of living area in a house

1. Sketch foundation

2. Measure all outside walls

3. If garage is attached, treat inside garage walls common to house as outside walls of house

4. Measure garage

5. Convert inches to tenths of a foot (or use a device marked in tenths)

6. Check that net dimensions of opposite sides are equal; if not, remeasure

7. Section sketch into rectangles

8. Calculate area of each rectangle

9. Add up the areas, subtracting the garage area, if necessary

10. Before leaving a house, always recheck dimensions

## Exercise 2-7

E. Volume—space that a three-dimensional object occupies

1. Cubic units—cube is made up of six squares

2. Formula for computing volume: V = L × W × H

3. Conversions—using like measures for volume

4. Volume of triangular prisms—Formula: V = 1/2(B × H × W)

## Exercise 2-8

VII. Statistics—science of collecting, classifying, and interpreting information based on the numbers of things

A. Population and Sample

1. Commonly used statistical terms

a. Variate—single item in a group

b. Population—all variates in a group

c. Sample—some of the population or some of the variates in that population

2. Random sampling

3. Sample size

4. Parameter and aggregate

a. Parameter—single number or attribute—describes an entire group or population of variates

b. Aggregate—total, or sum, of all variates

B. Organization of Numerical Data—two principal methods of arranging numerical data

1. Array—values or variates presented in order of size—Figure 2.1

2. Frequency distribution—values or variates are grouped to show the frequency with which each size or class occurs—Figure 2.2

C. Measures of Central Tendency—describes the typical variate in a population or sample and three measures of central tendency are

1. Mean—the average

2. Median—found by dividing the number of variates into two equal groups

a. If number of variates is odd, the median is the single variate at the middle

b. If number of variates is even, the median is the arithmetic mean of the two variates closest to the middle from each end

3. Mode—most frequently occurring variate

4. Selecting a measure of central tendency

D. Measures of Dispersion—computed to measure the spread of the data—three common measures of dispersion are:

1. Range—measure of the difference between the highest and lowest variates

2. Deviation—measure of how widely the individual variates in a population vary, as shown in Figure 2.3

a. Average deviation—measures how far the average variate differs from the mean

b. Standard deviation—measures the differences between individual variates and the entire population

E. Graphic Presentation of Data

1. Table—Figure 2.4

2. Bar chart—Figure 2.5

3. Histogram—Figure 2.6

4. Line graph—Figure 2.7

F. Normal Distribution—bell-shaped curve shown in Figure 2.8

**Exercise 2-9**

G. Skewness—measure of symmetry in a distribution; normal distribution shown in Figure 2.9

1. Positively skewed—longer tail to the right, as shown in Figure 2.10

2. Negatively skewed—longer tail to the left, as shown in Figure 2.10

H. Regression Analysis—makes use of basic principles of statistics to analyze comparable sales and determine line-item adjustments

## Summary

## Review Questions