APPENDIX B AN INTRODUCTION TO EXCEL

This appendix familiarizes the student with the basics of Excel. Specifically, the focus is on (1) the characteristics of the spreadsheet, (2) data entry, (3) the use of mathematical operations, and (4) statistical functions that are available. In addition, the appendix also focuses on methods of performing mathematical operations and entering equations. Those who are familiar with Excel may disregard Appendix B; however, discussion about the statistical functions forms the foundation for much of the text.

THE SPREADSHEET

Rows and columns form an Excel spreadsheet. Letters of the alphabet identify the columns, and the integer values such as 1 or 2 identify the rows. The rows and columns identify the cell address. For example, the cell address A1 appears in the column designated by the letter A and row 1 of the spreadsheet. Similarly, the cell address C3 appears in row 3 and the column identified by the letter C. The current cell address is listed in the window that appears in the fourth row of the toolbar on the left side of the spreadsheet.

Navigation in the spreadsheet is simple. Four arrows—up, down, left, and right—appear on the keypad. If, for example, the current cell address is C3, movement to C4 requires the use of the down arrow, whereas a movement to C2 requires the use of the up arrow. Similarly, movement to B4 requires the use of the left arrow, and movement to D4 requires the use of the right arrow.

The words File, Edit, Insert, Format, Tools, Data, Window, and Help appear in the first row of the menu bar. The novice uses File, Insert, and Tools the most frequently. When File is selected, the user may open a previously prepared file, close the current file, save the current file, and using the Save As function, save the current file with a different name or in a different drive. The "Page Setup" function

allows the user to alter margins, insert a header or footer, and select portrait or landscape as a printing format.

The insert function allows the user to insert another worksheet in the current worksheet and to insert a column or row in the current worksheet. To insert a column, simply locate the black down arrow on the appropriate letter. Select insert and then column. Similarly, to insert a row, locate the black arrow on the appropriate row number; select insert and then row. For this text, the functions in "Tools" are the most important. When Tools is selected, the set of statistical analyses and methods is immediately available in Data Analysis. Thus, selecting Tools and then Data Analysis allows the user to select statistical methods such as "Correlation," "Covariance," "Descriptive Statistics," "Exponential Smoothing," and various approaches to analysis of variance.

The second row of the menu bar contains a set of icons that are shortcuts to commonly used functions. The monitor icon allows the user to save the current worksheet, and the printer icon enables the user to print the current worksheet. The page and magnifying glass icon serves as a print preview, showing the page as it would appear in hard copy. When you return to the worksheet, the page preview is closed; dotted lines appear on the worksheet and show the boundaries of the page, a feature that facilitates the process of preparing the page or pages for presentation. The icon with a check and the letters ABC checks the spelling and grammar in the current worksheet. The scissors icon allows you to cut a field and move it to another location. To use the Cut function, highlight the field that you wish to move; locate the cursor in the cell in which the first observation will appear, and press the Enter key. For example, suppose that you want to move a column of data from one location in the spreadsheet to another. Highlight the column by placing the cursor in the cell with the first observation and then simultaneously selecting Control/Shift and the down arrow appearing on the keypad located at the lower left of the keyboard.

The Copy icon, identified by two pages, is used extensively when preparing a spreadsheet. This function enables you to transfer data or equations from one location in the spreadsheet to another. Simply highlight the data or material that you wish to copy (e.g., shift/control and down arrow). Select the Copy function. Move the cursor to the cell in which the first item will appear, and press Enter.

The AutoSum function, identified by the Greek letter Σ, is particularly valuable when preparing a spreadsheet and performing statistical calculations. It calculates the sum of data in the contiguous cells of a row or column. Simply locate the cursor in the cell in which you wish the summation to appear. Select the Auto Sum function, and press the Enter key.

It is sometimes useful or necessary to sort data in ascending or descending order. After entering the data, simply highlight the field in which the observations appear, and select the icon that has the letter A that appears above the letter Z. A down arrow also appears on the right side of the icon. Similarly, to arrange the data in descending order, highlight the field in which the data appear, and select the icon that has the letter Z appearing above the letter A. A down arrow also iden-

tifies the icon. In both cases, the data are automatically sorted in ascending or descending order.

As described in Chapter 2, the Chart Wizard function is invaluable when presenting data in graphic form. The Chart Wizard is identified by a multicolored bar chart and appears to the left of the icon that enables you to sort data in descending order. Chapter 2 provides details about this important function.

The Entry of Equations

Throughout this text, Excel is used to perform calculations after the equations have been entered in a worksheet. In general, when we enter an equation, common notation is used to identify the mathematical operations of addition, subtraction, multiplication, division, and exponentiation. Specifically, Excel recognizes the following notation when performing calculations:

1. Addition uses the plus (+) sign.
2. Subtraction uses the minus (−) sign.
3. Multiplication uses a star (*).
4. Division uses the slash (/).
5. Exponentiation uses a caret (^).

The ease with which equations are entered in a spreadsheet is shown in Exhibit B.1. Beginning in cells A6 to A10 is one series of data and in cells B6 to B10 is another. Suppose that we want to add the values comprising series 1 to those that comprise series 2. In this case, we simply

1. Locate the cursor on cell C6.
2. Enter the equation = A1 + B1.
3. Press enter.
4. Locate the cursor on the cell in which the equation resides.
5. Select the "Copy" function.
6. Highlight the remaining cells in column C (i.e., C2 to C10).
7. Press the enter key.

Exhibit B.1 The Use of Excel to Perform Mathematical Operations

Data Series 1	Data Series 2	Addition	Subtraction	Multiplication	Division	Exponentiation
4	1	5	3	4	4	16
6	2	8	4	12	3	36
8	2	10	6	16	4	64
10	4	14	6	40	2.5	100
12	5	17	7	60	2.4	144

In this example, subtraction simply requires us to

1. Locate the cursor on cell D6.
2. Enter the equation = A1 − B1.
3. Press enter.
4. Locate the cursor on the cell in which the equation resides.
5. Select the "Copy" function.
6. Highlight the remaining cells in column D (i.e., D2 to D10).
7. Press the enter key.

For multiplication, division, and exponentiation, simply substitute a star (*), a slash (/), and a caret (^) as the mathematical operator.

In our discussion of chi-square and the assessment of multiple proportions, it is useful to limit the operation of multiplication to a given row or column. If we wish to limit a set of calculations to the data appearing in column C and allow the rows to vary, we use $C1. Similarly, if we wish to limit calculations to the fifth row and allow the columns to vary, we use A$5. Finally, we frequently require calculations that involve a fixed value appearing in a given cell, for example, B6. In this instance, when we enter B6, the calculations are limited to the value in cell B6.

The IF Statement

We frequently use an IF statement as a method of making decisions in the context of a spreadsheet. The IF function tests a condition and results in one outcome if it is true and another if it is false. For example, consider Exhibit B.2 where we wish to consider the gender of eight patients. The letters M and F, representing a male or a female patient, respectively, are located in cells C17 to C24. Suppose also that we wish to assign a value of 1 to each of the male patients and a value of 0 to each of the female patients. In cell B17, we enter an IF statement as follows:

$$= \text{IF(C17} = \text{"M",1,0)}$$

Exhibit B.2 The IF Statement

ID	Male	Gender
1	1	M
2	1	M
3	0	F
4	1	M
5	0	F
6	0	F
7	0	F
8	1	M

Excel interprets the IF statement as follows: If the entry in cell C17 is the letter "M," a 1 is recorded in cell B17. If the entry is not the letter "M," 0 is recorded. The other values in column B of Exhibit B.2 were obtained by using the "Copy" function as described previously.