# Appendix E: How to Use Spreadsheet Software

E.1   How to Use Formulas in Spreadsheets

Formulas use data already entered into a spreadsheet to calculate a result. This result will appear in the cell where the formula has been entered. To refer to a group of cells, or an array, you would refer to opposite corners of a block, separating them with a colon (cell references must be separated with two periods in Quattro Pro). For example, in this picture, the cells selected in the box would be referenced as **B2:C6** (**B2..C6** in Quattro Pro).

The first six cells in column B would be referenced using the beginning and ending cells **B1:B6** (**B1..B6** in Quattro Pro). You can also list cells individually, separating them with commas (**B1**, **B2**, **B3**, **B4**, **B5**, **B6**).
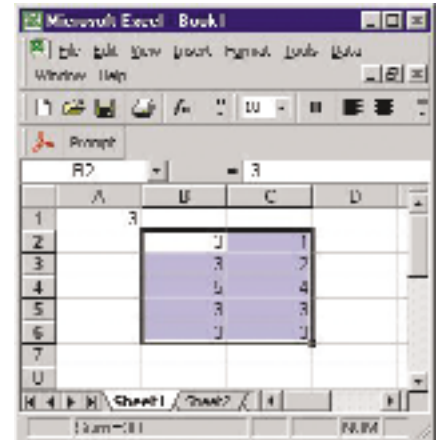
The following formulas might be of use to you in this course:

=AVERAGE(A1:A10)	Returns the arithmetic mean of the numbers in cells A1 to A10; in Quattro Pro use **AVG(A1..A10)**.
=COMBIN(n, r)	Returns $_nC_r$; in Quattro Pro use **COMB (n, r)**.
=CORREL(A1:G1, A2:G2)	Returns the correlation coefficient between two data sets.
=INT(C12)	Rounds the number in cell **C12** to the nearest integer.
=INTERCEPT(A1:F1, A2:F2)	Returns the *y*-intercept of the linear regression line through the given *y*-values **A1** to **F1**, and the given *x*-values **A2** to **F2**.
=NORMDIST(X, μ, σ, 1)	Returns the normal distribution probability for **X** given the mean μ and standard deviation σ.
=NORMINV(p, μ, σ)	Returns the inverse of the normal cumulative distribution for the mean μ and standard deviation σ.
=PERMUT(n, r)	Returns $_nP_r$.
=QUARTILE(C1:C10, n)	Returns minimum (**n**=0), 1st Quartile (**n**=1), Median(**n**=2), 3rd Quartile (**n**=3), or maximum value (**n**=4) for the cells **C1** to **C10**.
=SLOPE(A1:F1, A2:F2)	Returns the slope of the linear regression line through the given *y*-values **A1** to **F1**, and the given *x*-values **A2** to **F2**.
=STDEV(B1:B4)	Estimates the standard deviation based on cells **B1**, **B2**, **B3**, and **B4**; in Quattro Pro use **STD(B1..B4)**.
=SUM (A1:A10)	Calculates the sum of the cells **A1** to **A10**.

Many other statistical functions are also available. To learn more about them, use the Help files associated with your spreadsheet software.

E.2 How to Use IF Statements in a Spreadsheet

Logical operators are spreadsheet commands that test a logical condition and return defined values. They are useful in creating simulations of experiments on a spreadsheet.

IF(condition, TRUE_value, FALSE_value) will return the TRUE_value if the condition is true; otherwise, the FALSE_value will be returned. When looking at the spreadsheet, only the value of the expression will be visible (TRUE_value or FALSE_value). To edit the formula, you must click on the cell and make your corrections in the text box.

Example
Create an equation that will return 75 if the sum of cells A1 to A4 is greater than 4. If A1 is less than or equal to 4, then return 50.

Solution

IF(SUM(A1:A4)>4, 75, 50)

E.3 How to Create and Display Random Numbers

The **RAND()** function will display a random real number between 0 and 1. It is useful for creating simulation data. To generate random numbers in another range, multiply RAND() by the difference between the high and low number, and then add the new low number [RAND() * (high number – low number) + low number].

Example
Generate a random number between
(a) 1 and 10   **(b)** 15 and 60

Solution

(a) While within a spreadsheet, key in the following equation: @RAND*9 + 1.
(b) While within a spreadsheet, key in the following equation: @RAND*45 + 15.
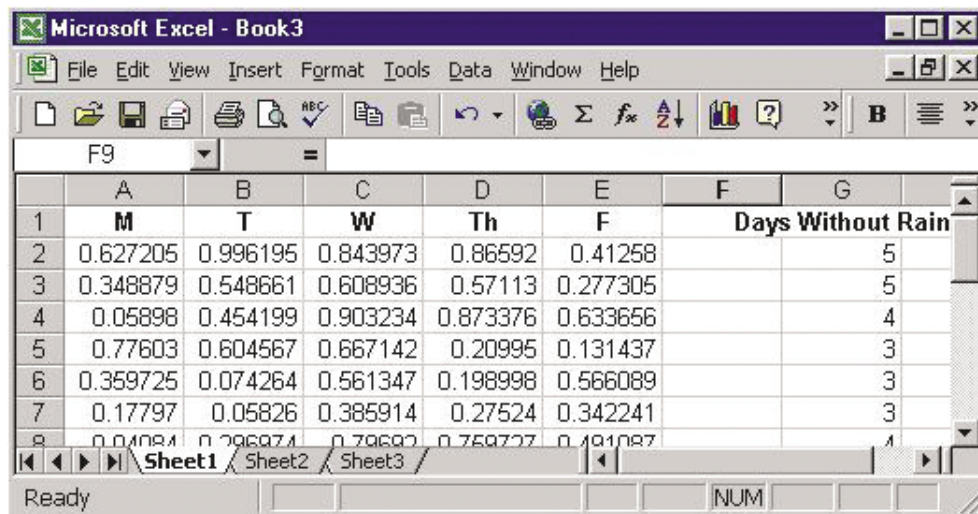
E.4 How to Perform a Simulation

Using the random number generator, you can create a spreadsheet simulator that will allow you to calculate an experimental probability.

Example

Roberto estimates that the probability of rain is 0.25. Create a simulation that calculates the probability of Roberto having a week (5 school days) when it does not rain. Carry out 20 trials.

Solution

1. In a new spreadsheet, make labels for 5 columns (M, T, W, Th, F) for the 5 days of the week, and then make a column to total the number of days without rain.
2. Paste the equation =RAND() into an array that is 5 wide and 20 long. This will represent the simulation of 20 trials of 5 days a week.
3. Count the number of rows that contain 5 days without rain. Divide this number by 20 to calculate the probability.

	A	B	C	D	E	F	G
	M	T	W	Th	F		Days Without Rain
2	0.627205	0.996195	0.843973	0.86592	0.41258		5
3	0.348879	0.548661	0.608936	0.57113	0.277305		5
4	0.05898	0.454199	0.903234	0.873376	0.633656		4
5	0.77603	0.604567	0.667142	0.20995	0.131437		3
6	0.359725	0.074264	0.561347	0.198998	0.566089		3
7	0.17797	0.05826	0.385914	0.27524	0.342241		3
8	0.04084	0.296974	0.79692	0.759727	0.491087		4

Microsoft Excel - Book3
File Edit View Insert Format Tools Data Window Help

Sheet1 / Sheet2 / Sheet3

Ready   NUM

E.5   How to Create a Histogram

Both Microsoft Excel and Corel Quattro Pro have the ability to define a series of cells and create a histogram from that data.

Enter Data
Key the data into a series of rows or columns. Remember to include the labels with the data, if applicable.

Select the Cells
Using the mouse, select the cells that you want to study in a graphic format. Select **Chart** from the **Insert** menu.

Set Up Parameters
Follow the instructions provided by your software package to complete the process.

Once a chart has been created, it can be copied and pasted into a word-processing document.

Example
Enter the following data into a spreadsheet program, and then create a histogram of the results.

	J	F	M	A	M	J	J	A	S	O	N	D
Temperature (˚C)	3	–1	4	8	13	18	21	19	16	13	8	2
Rainfall (mm)	41	55	38	31	30	27	22	25	29	35	41	43

Solution

1. Open a new spreadsheet and enter the data given (including labels).
2. Select all the cells and then click **Insert**, **Chart**.
3. Follow on-line instructions.