

Appendix A

Excel 16 for Mac

Excel techniques

Following, in alphabetical order, are short descriptions of the most useful Excel techniques. There are usually multiple ways to perform any technique. You may discover others that you prefer, such as keyboard shortcuts.

The notation gives the ribbon > the group within the ribbon > the drop-down menu (if any) > the command. For example, “**Home > Cells > Insert > Insert Sheet Rows**” means: Click on the **Home** tab to bring up the Home ribbon; within the **Cells** section of the ribbon, find **Insert**; open its drop-down menu and select **Insert Sheet Rows**.

These descriptions will be a little more ambiguous than for other Excel versions since there is both a ribbon and menus, which may share names. In those cases, we will say, for example, “the menu **Insert**.” It is assumed to be a ribbon if not specified. Also, the ribbon does not have labeled sections, so you will be given directions for finding the buttons such as “toward the left” or “next to the \$ button.”

Absolute reference

Why: Keep copied or AutoFilled formulas pointing to the same row, column, or cell.

How: Put \$ in front of any part of the cell reference that you want to keep fixed. For example, \$A1 in a formula always refers to column A, C\$5 always refers to row 5, and \$G\$7 always refers to cell G7, even when copied elsewhere in the spreadsheet.

Reference: Introduced in Chapter 4, used in Case Studies 8, 9, 18, and 19

AutoFill a sequence

Why: Save yourself the trouble of entering a sequence like 1, 2, 3, etc. or the same value in successive cells.

How: *Select* the first one or two cells. Click and drag the fill handle (the tiny square in the lower right corner of the lower right cell) down or across the

cells you want to fill. Note that the cursor turns into a black plus sign when you are on the fill handle. When you finish will also see an AutoFill Options icon with choices on a drop-down menu that give you some control over how it fills.

Reference: Introduced in Chapter 4, used in Case Studies 3, 6, 11, 16, and 19, and Chapters 12 and 14

AutoFill to clone a formula

Why: Save yourself the trouble of entering a formula in successive cells. Use bucket brigade formulas.

How: *Select* the cell(s) containing the formula(s). Move the cursor to the lower right corner of the selection and drag the fill handle (tiny square) down or across the cells you want to fill. To fill an array, fill down the first column and then with the column still selected, fill across.

Reference: Introduced in Chapter 4, used in Case Studies 3 through 15 and 17 through 19

AutoSum

Why: The easiest way to add a column of numbers is to use the **AutoSum** button. Add income, expenditures, future costs, or preference points. Use totals as a step in computing an average.

How: The AutoSum button is in **Home** on the far right and looks like Σ . Click on a cell below the list you want to total. Then click on the **AutoSum** button. Excel shows you which cells it is going to sum, by drawing a box around them. It gives you the summation formula to accept or modify. If it's what you want, press **return**.

Note that, if you have any blank cells in the column, AutoSum may not select all the cells you want. Check the formula. While it's displayed just drag over the cells that you want to sum, or drag a corner of the highlighted area, and the formula will fix itself. Then press **return**.

Click on the arrow to the right of the button to see and select the other options, such as average.

Reference: Used in Case Study 2, Chapter 3, and elsewhere

Bold and italics

Why: You can highlight column or row headers, major inputs or outputs, or other cells of interest.

How: *Select* the cells you want to format. Click on the **B** icon for bold or the *I* icon for italics under **Home** in the font area (toward the left). Click on the icons again to turn them off.

Reference: Used in Case Studies 2 and 11 and Chapter 12

Browse the function library

Why: Explore the functions that Excel makes available for you to use in formulas. Get help entering the arguments of functions.

How: *Select* the cell where you want the function to calculate. Click on the **Formulas** Insert Function, far left, which looks like fx. Search or select a function from the list in the dialog box. Click on any of the listed functions and read the description at the bottom. Select the function you want and click **Insert function**. Another window opens up, telling you exactly what information (arguments) you need to give the function. Fill in the arguments one by one. Use the descriptions and click on cells you want to use. Check the result it gives you. Click **Done**.

Reference: Introduced in Chapter 7, used in Case Study 6 and Chapters 9 and 15.

Bucket brigade formulas

Why: Build complex calculations line-by-line with simple formulas.

How: Set up rows that take you step-by-step to your outcome. Often these represent years. Fill in the first row. Then write formulas in the second row that take advantage of the calculations in the previous row. Make sure the formula applies as well to any of the subsequent rows. You may need to use *absolute references* to do this. *AutoFill* the formulas down the columns.

Reference: Introduced in Chapter 5, used in Case Studies 4, 5, 6, 8, 9, 11 through 15, 17, and 18

Change column width or row height

Why: Make the column wide enough to display the text or numbers in it. A too-narrow column shows just #s.

How: Hover the cursor over the little line between the column headers (letters) until a vertical line crossed by a double-headed arrow appears. Drag it right or left to make the column wider or narrower. Another way is to use **Home** > cells group toward left > **Format** > **Cell Size** > **AutoFit Column Width**. Make a row taller similarly.

Reference: Used in Chapter 3 and Case Studies 2, 4, 5, and 11

Chart your results

Why: A picture is worth a thousand numbers. Use a chart to display a visual image of your results.

How: First select a table with or without labels. Select the menu **Insert > Chart >** the chart type you want, such as a bar or pie chart. Customize a chart by clicking on it, if necessary, to get **Chart Design** in the ribbon.

Reference: Introduced in Chapter 11, used in Case Studies 10 and 16

Clear an area of the spreadsheet

Why: This erases trial (“scratchpad”) calculations or anything else you wish to delete permanently.

How: Clear one rectangular area at a time. **Select** the area. Choose **Edit > Clear > Clear all**. This removes everything from the cells, including formatting. The cells themselves are still there but are empty. The drop-down menu that includes “**Clear all**” gives you options to clear only certain aspects.

Reference: Used in Case Study 3

Copy a cell or a block of cells

Why: Rearrange a spreadsheet to make it clearer and easier to use. Use copied blocks of cells elsewhere and build new spreadsheets by lifting from old ones.

How: **Select** a block of cells. Choose **Edit > Copy**. Click on the upper left corner of the new location and choose **Edit > Paste**. Note that you overwrite whatever is already there. Use **insert** instead, if you want what’s there to move to make room. Note that cells with formulas using **relative reference** will change when copied.

Reference: Used in Case Studies 9 and 16.

Copy formats

Why: Reuse formats that you like anywhere else in the spreadsheet.

How: Click on any cell that’s formatted as you like. Click on the Format Painter (the paintbrush icon) on **Home**, far left, then drag over the cells you want to format.

Reference: Used in Case Study 17

Create names

Why: Names for inputs or other frequently used cells make formulas easier to read. You can then copy the formulas and they always refer to the same cells. This is particularly convenient if you've already labeled the cells.

How: Enter the names you want next to the cells that you want to name and select both names and cells. You may even already have labels that you can use for names. Use the menu **Insert > Name > Create...** A dialog box asks you where the names are relative to the cells. Correct, if needed, and click **OK**.

Reference: Introduced in Chapter 3, used in Case Studies 5, 6, 11, 12, 13, 14, 16, and 17

Currency and percent format

Why: Make numbers that represent currency look like it with a dollar sign (\$) and two decimal places. Make percentages look like percentages.

How: *Select* the cells. Click on the currency button, \$, or the percent button, %, in **Home** near center.

Here's another way to do it: Excel automatically formats for you if you include the \$ or % while entering data.

Note that Excel stores percentages as decimals. For example, 5% is stored as .05. If you enter 5 and then format as a percentage, you'll get 500%. To prevent this problem, format before entering, or use the % in the entered number.

Reference: Used in Chapter 3 and Case Studies 3 and 4

Data table

Why: Look at outcomes over a large number of situations, do sensitivity analysis, or make a Monte Carlo model.

How: Find a place to put the table and label columns for the input and output(s). Just below the output headers, put a formula for each of the outputs. Just below this formula row, list in a column all the input values you'd like to look at. *Select* the rectangle that includes the formulas that you've just entered and the column of inputs you want it to use, but not the labels. Select the menu **Data > Table...** A dialog box appears. Click in

Column input cell. Then click on the cell that contains the input for your main spreadsheet. Click **OK**.

Reference: Introduced in Chapter 12, used in Case Studies 16 and 19

Decrease decimal

See *Increase or decrease decimal*.

Delete rows, columns, or cells

Why: As your spreadsheets evolve, you may find you have data and calculations that you no longer need.

How: *Select* the rows, columns, or cells. For rows or columns, choose the menu **Edit > Delete**. This deletes without a prompt. For cells, it's **Edit > Delete...**, then in the dialog box, choose what it moves to fill in the missing cells.

Cells move to fill in the hole left by what was deleted. Formulas automatically adjust for the new cell locations. By the way, the **Delete** key does not do this; it works like *Clear*.

Descriptive formula

Why: Write a formula in an easily readable form to guide entry, document the spreadsheet, and reuse the formula elsewhere.

How: This is a pencil-and-paper technique to guide you in writing functions in cells. Identify each cell by its column header (in italics), possibly followed by “previous.” This tells you whether the cell is in this row or the previous one. Use these descriptors to represent cell references in a formula. The formula may be preceded by the name of the row. For example,

Running total: = *Running total* previous + *Net*

adds the contents of the cell in the previous row under the **Running total** column to the contents of the cell in this row under the **Net** column and puts the answer in this row under **Running total**. Enter it by clicking on the referenced cells and typing the rest (e.g., = and +). You may sometimes see descriptive formulas that reference columns, depending on how the spreadsheet is organized, as in Case Study 18.

Descriptive formulas that use functions may use italics and the normal font to represent generic arguments. Italics are also used to represent general inputs, as in Appendix D.

Reference: Introduced in Appendix B, Chapter 5, and Case Study 4, used in Chapter 4, Case Studies 4 through 7, 11 through 15, 17, and 18

Edit the contents of cells

Why: Fix mistakes or expand formulas. Add \$ to formulas to get absolute references.

How: Double click on the cell. Click on the entry or the formula bar to place the cursor. Insert by typing. Delete characters with the **delete** key. Select with the mouse. If the cell you're editing contains a formula, click on other cells to include them in the formula. Press **return** when you're done or **esc** to put it back the way it was. Be sure to finish editing a formula and enter it before using the arrow keys or clicking on other cells, unless you want those cells to appear in the formula.

Reference: Used in Case Studies 6, 9, 11, 12, 16, 17, and 19

Enter information in cells

Why: Cells are where you put information in the form of numbers, dates, currency, text, formulas, etc. See also **Write formulas**.

How: Click on the cell and start typing. Excel goes into entry mode. Text appears in the cell and in the formula bar as if by a tiny word processor that works only for that cell. Edit your entry in the cell or formula bar by using **delete** or moving the cursor. Press **return** or **tab**. What you typed is now stored in the cell, where other cells can refer to it. Use **return** for entering data in columns and **tab** for filling rows. Note that, even if you **select** several cells, your entry appears only in the first cell. Note that AutoComplete may make suggestions if you start typing something it has seen above. Accept it by clicking on it or keep typing to ignore it.

Reference: Used in all Case Studies

Format cells

Why: Highlight cells of special interest or put them in an appropriate form, such as for money, percentages, dates or times.

How: The most common formats are in **Home** just left of center.

Hover the cursor over each tool to explore what it does. To apply formatting, **select** the cells that you wish to format and click on the desired features. See **Bold and italics**, **Currency and percent**, **Increase or decrease decimal**, **Copy a format**, **Special format for numbers**, or **Wrap text**.

Reference: Used in Chapter 3 and Case Studies 2 through 5, 9 through 11, 13, 16, and 17

Formula

See *Write formulas*.

Functions

Why: Excel has a library of functions to use in formulas to do a wide variety of calculations. For example, **SUM** totals a column.

How: Enter the formula in the form *=function name (function arguments)*. Separate the arguments with commas. The arguments for the **SUM** function, for example, are the values to be totaled. See Chapter 8 or *browse the function library* to see what the particular arguments are for each function. You may also use functions in a larger formula.

Reference: Introduced in Chapters 7 through 10, used in Chapters 10 and 14, Case Studies 7, 9, 12, 14, 15, 16, and 18

Goal Seek

Why: Work the problem backwards to find an input that gives you the desired output. Find out what you need to reach a goal.

How: Identify the input cell that you want to find and the output cell that you need to reach a numerical goal. Select **Tools > Goal Seek**. In the dialog box, enter or click on the cell in which you want to reach a number, type the number that you want it to reach, and click on the input cell that you want to change. Excel puts the answer in the input cell. (If it doesn't appear, double click on the input cell.)

Reference: Introduced in Chapter 13, used in Case Studies 17 and 18

Hide rows or columns

Why: Focus on results, rather than on intermediate calculations.

How: *Select* the rows or columns to hide. For columns, choose the menu **Format > Columns > Hide**. To make it all reappear, *select* the adjacent columns and choose **Format > Columns > Unhide**. The technique for rows is similar.

Reference: Used in Case Study 13 and Chapter 15

Increase or decrease decimal

Why: Show currency rounded to the nearest dollar or cent. Make the number of decimals shown in a column consistent. Show enough significant digits for very small numbers.

How: *Select* the cells. Click on the increase decimal or decrease decimal button under **Home**. These buttons appear with other cell formatting, such as \$ and % left of the center of the ribbon

This changes only the displayed number. The one used in the calculations keeps all its accuracy.

Reference: Used in Case Studies 9, 10, and 13

Insert rows, columns, or cells

Why: You often build new spreadsheets from old ones. This means moving things around to make room for new data or calculations.

How: *Select* the rows, columns, or an area in which you want to insert new cells. It's OK if there's already something there; Excel moves it to make room. Select the menu **Insert > Rows** or **Inset > Columns**. This inserts without a prompt as many rows or columns as selected. If you select a block of cells, use **Insert > Cells....** In the drop-down menu, choose which way you want the adjacent cells to move to make room, then **OK**. Blank cells appear and everything else moves out of the way. Excel automatically adjusts all formulas for the new cell numbers.

Reference: Used in Chapter 5 and Case Studies 9, 12, 13, 17, 18, and 19

Italics

See *Bold and italics*.

Name cells

See *Create names*

Open a workbook

Why: Start a new spreadsheet from scratch or use an existing one.

How: Start Excel. Click on **New** in the left bar, then **Blank workbook** to start from scratch or **Open** in the left bar, which prompts you to find a file to open. Excel files end in .xlsx.

Reference: Used in all Case Studies

Percent

See *Currency and percent formats*.

Reference cells

Why: Refer to cells in formulas so you can use them in the calculation. The references are also useful when you are talking about spreadsheets.

How: Excel refers to a cell by its column and row. For example, the upper left cell is 'A1'. Excel refers to a rectangular area by its upper left and lower right corners. See the area B2:C4, below:

	A	B	C	D
1				
2				
3				
4				
5				

Rows and columns use a similar notation. For example, row 3 is 3:3, and column D is D:D. You may also see a \$ in references. See *Absolute reference*.

Reference: Used in all Case Studies

Relative references

Why: Automatically change cell references in formulas when copied; construct bucket brigade formulas.

How: Click on unnamed cells when entering formulas to get the standard "A1" relative reference. See *Absolute references*.

Select cells

Why: Select a single cell to enter something in it. Select single or multiple cells to format them or use them in a formula.

How: Select a cell by clicking on it. Use this guide to select multiple cells:

To select	Click
Multiple cells in a rectangle	...and drag upper left to lower right
A column	its letter
A row	its number
The whole sheet	the box in the upper left corner, right above the column of row numbers

Reference: Used in all Case Studies

Sort and filter

Why: Focus on rows of special interest. Put lists or data in order.

How: Start with a table with column headers and with no adjacent filled cells. Click somewhere in the data. Select **Home > Sort & Filter** (the funnel icon to the far right) > **Filter**. A drop-down menu appears, attached to each header. Open any one of them to see all values in the column. Uncheck **(Select All)**, then pick one and see only the rows with that value. For example, look just at incomplete or assigned tasks. Alternatively, you can filter by conditions such as greater than some value. At the top of the dialog box you can sort rows, but first check that you can get back to the original order if you need to.

Special format for numbers

Why: Make dates, times, or other numbers look like what they are.

How: *Select* cells. Choose the menu **Format > Cells... > Number** format drop-down menu. Click on the desired format.

Reference: Used in Case Studies 3 and 4

Split the worksheet

Why: Look at two parts of a large spreadsheet at once.

How: *Select* the row or column where you want the split. Select the menu **Window > Split**. You will get two panes that scroll independently. Repeat to un-split. Split in both directions by first selecting a cell to get four panes.

To keep the left and/or topmost panes (usually your headers) from scrolling, freeze them by choosing the menu **Window > Freeze Panes**. To put it back, choose **Window > Unfreeze Panes**.

Reference: Used in Chapter 13 and Case Studies 6, 16 and 18

Undo an action

Why: Everybody makes mistakes.

How: Choose the Undo icon (the arrow pointing back to the left at the top left of the screen) as many times as you want to back out of the last things you did. The Undo icon shows what it's going to undo before you choose.

Wrap text within a cell

Why: Sometimes, a cell contains long, descriptive text. Make the text visible while keeping the columns a reasonable size by wrapping it to multiple lines within the cell.

How: *Select* the cell or cells. Select **Home > Wrap text** in the 4th grouping.

Reference: Used in Case Studies 2, 4, and 16

Write formulas

Why: Formulas do calculations based on everything else in the spreadsheet. Without them, Excel is nothing but a list manager.

How: Click on the desired cell and type = to tell Excel you are entering a formula. Until you **return** or **tab** to enter the formula, you are in formula entry mode and everything you do goes into the formula. When you click on cells, they become part of your formula. This is the easiest way to enter formulas. You can also type numbers, arithmetical operators (+, -, *, /, ^), parentheses, and Excel functions with their arguments.

Reference: Introduced in Chapter 3, used in Case Studies 3 through 19

See Appendix D for some of the most useful formulas.