

# Application Tips for Spreadsheets

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**Course:** BUS 302

**Title:** *The Gateway Experience* (3 units)

“Numerical quantities focus on expected values, graphical summaries on unexpected values.”

---John Tukey (1915-2000)

## Introduction

Most contemporary business students use Microsoft Excel (MS-Excel) for the production of their case reports and presentations. MS-Excel (and other spreadsheets similar to MS-Excel) offers a large number of features. The purpose of this document is to help BUS 302 students understand the features and functionality that are *critical* to success in BUS302 and subsequent courses.

If this document is unclear, please contact the instructor.

## Statistical Functionality in Excel for Windows

Business students will need the “Analysis Toolpack” installed. This “add-in” provides statistical functionality that is taught in 100-level college courses and used in higher-level courses. By default, the “Analysis Toolpack” is *installed* on the computer, but not *loaded* by Excel when Excel starts. Enabling the “Analysis Toolpack” in Excel when Excel starts is done by selecting “File | Options | Add-ins” (or similar), and then selecting “Go” next to the “Manage (Excel Add-ins)” field near the bottom of the screen. Select the “Analysis Toolpack” field in the list that appears. Business students will eventually take SOM 306 (Operations Management) too, so selecting the “Solver Add-in” is useful also. Select “Ok”, and re-start Excel.

Important statistical tools such as “Regression” can now be used by selecting “Data | Data Analysis | Regression” from the main Excel menu. Other useful tools are “Descriptive Statistics”, “Histogram”, and various “t-Tests”. Since the “Analysis Toolpack” add-in walks a spreadsheet user through various tests step-by-step, sometimes the add-in referred to as a “wizard”.

## Statistical Functionality in Excel for MacOS

In general, MS-Excel works the same way in both the Windows and MacOS environments. MS-Excel 2016 and later for the Mac contains the Data Analysis Toolkit and the Solver. Unfortunately, however, there is no “Analysis Toolpack” per se for Excel

for the Mac. The closest thing is called “Statplus:mac LE”. It is free, and can be downloaded and installed from:

<http://www.analystsoft.com/en/products/statplumacle/>

This works for both Excel for the Mac 2011 and Excel for the Mac 2008. This product isn’t from Microsoft, but it is the add-in tool that is recommended by Microsoft in Excel’s help system. It works similarly to the “Analysis Toolpack” for Excel for Windows. In general, this add-in walks a spreadsheet user through various tests step-by-step.

## **Statistical Functionality in other Spreadsheets**

Similar commands exist in other spreadsheet applications, such as LibreOffice Calc, OpenOffice Calc (Linux/MacOS/Windows), Gnumeric (Linux/MacOS/Windows), and Numbers (MacOS). Similar commands may exist in online spreadsheet applications, such as Zoho Sheet or Google Docs. The functionality can be limited but it is indeed improving each year. In LibreOffice, OpenOffice, Numbers, and GoogleDocs, there are no statistical “add-ins” or “wizards”—a spreadsheet user just uses the relevant functions for analysis such as hypothesis testing (e.g., “=ttest) or linear regression (e.g., “=linest”, “=slope” or “=intercept”).

Replicating the functionality of the statistical “add-ins” for Excel for either Windows or Mac often requires the user to do some additional manual calculations in the spreadsheet. The following web page can help with the approach and the formulas need to test, for example, whether the slope coefficient and/or the y-intercept coefficient from a linear regression are statistically significant:

<http://stattrek.com/regression/slope-test.aspx>

If calculating the standard error, t-statistic, and p-value for the slope and/or y-intercept is too difficult or confusing, it might be easier to just use the PC’s in the COBAE computing lab.

## **Functions**

Business students must have very strong skills with financial functions. For example, the “Chatsworth Sports Products” case requires use of the concept of Present Value. In general, the built-in function for present value is =PV. In addition to using the built-in function, strong students often enter key formulas in full mathematical form to double-check their work. Other important financial functions are future value (=FV) and payments (=PMT).

In addition, business students must have strong skills with statistical functions. For example, the “Chatsworth Sports Products” case requires finding the median value. The built-in function for finding the median of series is =MEDIAN. Similar to financial

functions, strong students often enter key formulas in full mathematical form to double-check their work and improve their understanding of their analysis. Other important statistical functions are mean (=AVERAGE), standard deviation (=STDEV), count (=COUNT), maximum (=MAX), minimum (=MIN), correlation (=CORREL), Z-test (=ZTEST), and *t*-test (=TTEST).

## Exploratory Graphics

Business students must have very strong skills with all types of graphics, including charts and plots. For example, the “Chatsworth Sports Products” case requires use of one or more scatterplots. A scatterplot plots two continuous variables—one variable on the X-axis and one variable on the Y-axis. MS-Excel refers to scatterplots as an “X-Y Chart.” Bar-charts of tabular data and histograms of continuous data are also common. Line charts are really just scatterplots with the X-axis constrained to be a time series variable. Once the data has been computed correctly in MS-Excel, the command sequence to generate a chart or a plot is “Insert | Chart.”

## Cell References

Business students must have very strong skills with every aspect of cell references. Some cell references are *absolute* (e.g., for given or fixed parameters), some cell references are *relative* (e.g., for variables or changing parameters), and some cell references are *mixed* (i.e., the row will be held constant and the column will be changing, or vice-versa). Cell references can even refer to cells in different worksheets within the same workbook (.xls file). Cell references can even be named—for example, “=sales-costs” might be easier to interpret than “=B1-B2.”

## Cell Auditing

Business students must know the mathematics of the formulas in cells. In addition to visual inspection on a cell-by-cell basis, strong students “audit” all their formulas in detail. Occasionally, this “audit” of formulas is required in subsequent courses or on the job. By default, “Formula Auditing Mode is off.” That is, a cell that contains a formula will display the *result* of the formula in the cell. The command to enable (and subsequently disable) “Formula Auditing mode” is “Tools | Formula Auditing | Formula Auditing Mode.” In “Formula Auditing” mode, a cell that contains a formula will display the *actual formula* in the cell (rather than the result of the formula).

## Copying and Pasting

Business students must have strong skills with copying and pasting. This skill not only applies to content (usually formulas) within a worksheet, but also to content (including tables and charts) between MS-Excel and MS-Word, or similarly, between MS-Excel and MS-Powerpoint.

## Formatting

Business students should practice with all of the formatting features in MS-Excel. For example, all numbers need to be aligned on a decimal (or if not decimal is present, the alignment should assume the correct, implied decimal place). Students should master how to use “borders,” “double underlines,” and similar features in order to present their work in the manner expected of quality professionals, managers, and executives.