**WORK WITH SPREADSHEETS**

[**THE AMAZING SPREADSHEET**](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/cS8lM/the-amazing-spreadsheet)

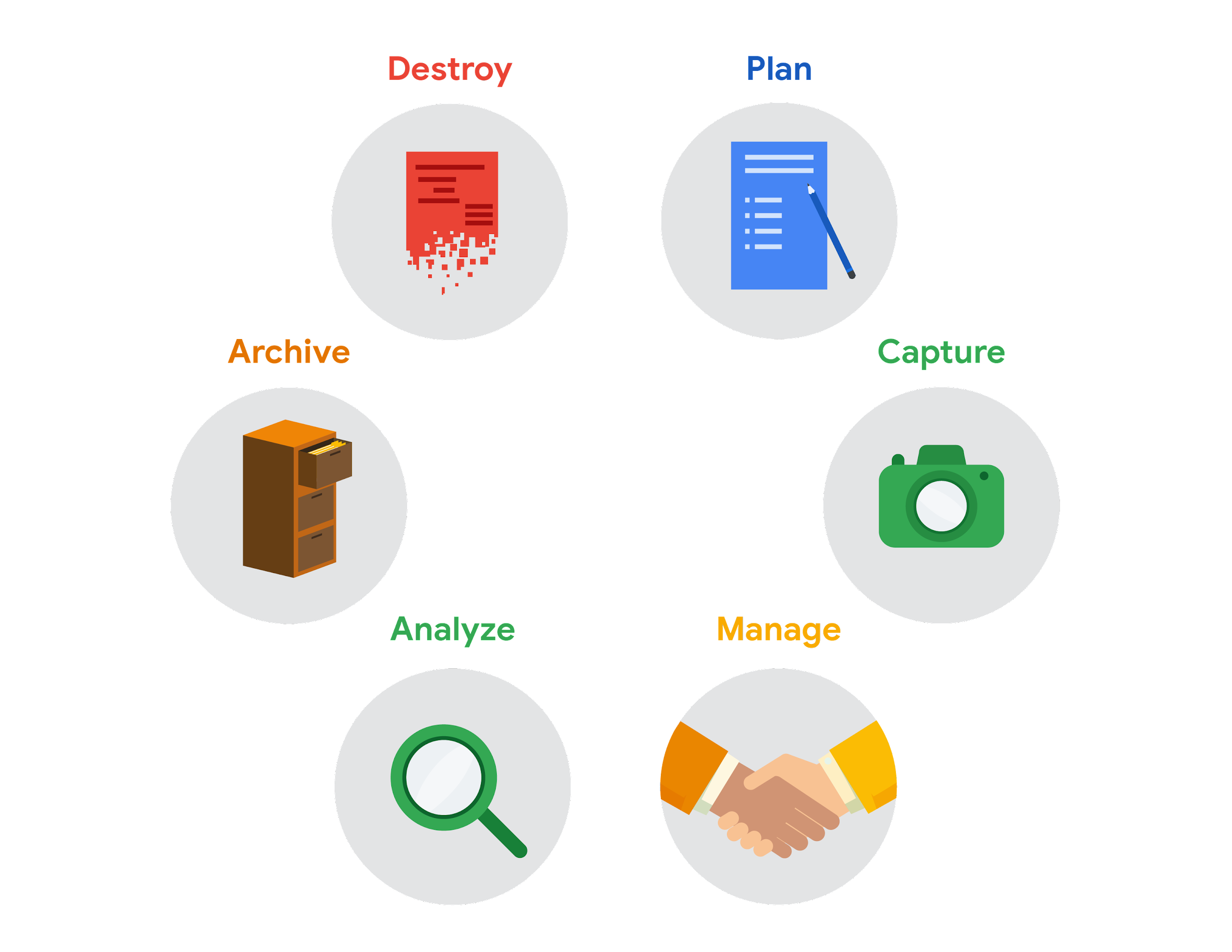
Spreadsheets are a powerful and versatile tool, which is why they're a big part of pretty much everything we do as data analysts. There's a good chance a spreadsheet will be the first tool you reach for when trying to answer data-driven questions. After you've defined what you need to do with the data, you'll turn to spreadsheets to help build evidence that you can then visualize, and use to support your findings. Spreadsheets are often the unsung heroes of the data world. They don't always get the appreciation they deserve, but as a data detective, you'll definitely want them in your evidence collection kit. I know spreadsheets have saved the day for me more than once. I've added data for purchase orders into a sheet, set up formulas in one tab, and had the same formulas do the work for me in other tabs. This frees up time for me to work on other things during the day.

[**GET TO WORK WITH SPREADSHEETS**](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/182ab/get-to-work-with-spreadsheets)

Construction firm example: This will be different for each job, but you might start by organizing your data with the task you've been given.For example, you might put your data in a pivot table. Next, you might sort and filter the data in the pivot table. This lets you focus only on the data you'll need for your analysis. In our example, maybe you only need the expenses for a certain time frame, like the last three months. After you filtered your data, you could perform some calculations to learn more about it. Maybe you need to find out which construction projects ended up costing the most money. This is where formulas and functions are really handy.

[**SPREADSHEETS AND THE DATA LIFE CYCLE**](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/ALVYZ/spreadsheets-and-the-data-life-cycle)

To better understand the benefits of using spreadsheets in data analytics, let’s explore how they relate to each phase of the data life cycle: plan, capture, manage, analyze, archive, and destroy.

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* Plan for the users who will work within a spreadsheet by developing organizational standards. This can mean formatting your cells, the headings you choose to highlight, the color scheme, and the way you order your data points. When you take the time to set these standards, you will improve communication, ensure consistency, and help people be more efficient with their time.
* Capture data by the source by connecting spreadsheets to other data sources, such as an online survey application or a database. This data will automatically be updated in the spreadsheet. That way, the information is always as current and accurate as possible.
* Manage different kinds of data with a spreadsheet. This can involve storing, organizing, filtering, and updating information. Spreadsheets also let you decide who can access the data, how the information is shared, and how to keep your data safe and secure.
* Analyze data in a spreadsheet to help make better decisions. Some of the most common spreadsheet analysis tools include formulas to aggregate data or create reports, and pivot tables for clear, easy-to-understand visuals.
* Archive any spreadsheet that you don’t use often, but might need to reference later with built-in tools. This is especially useful if you want to store historical data before it gets updated.
* Destroy your spreadsheet when you are certain that you will never need it again, if you have better backup copies, or for legal or security reasons. Keep in mind, lots of businesses are required to follow certain rules or have measures in place to make sure data is destroyed properly.

## **Resources for more information**

Spreadsheet shortcuts can help you become more efficient with spreadsheets. If you’d like to learn more, you can explore the collection of [Google Sheets shortcuts](https://support.google.com/docs/answer/181110), or visit the [Microsoft Excel shortcuts](https://support.microsoft.com/en-us/office/keyboard-shortcuts-in-excel-1798d9d5-842a-42b8-9c99-9b7213f0040f) page if you are using Excel. Both of these resources contain a list of spreadsheet shortcuts you can save and reference as you work more with spreadsheets on your own.

**[HANDS-ON ACTIVITY: INTRODUCTION TO GOOGLE SHEETS](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/xMQnU/hands-on-activity-introduction-to-google-sheets)**

[**STEP-BY-STEP: BASIC SPREADSHEET TASKS**](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/rhx5S/step-by-step-basic-spreadsheet-tasks)

[**BASIC SPREADSHEET TASKS**](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/lpuHf/basic-spreadsheet-tasks)

**[LEARN MORE ABOUT SPREADSHEET BASICS](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/0vdZZ/learn-more-about-spreadsheet-basics)**

Below, you will find a list that covers two types of spreadsheet programs: Microsoft Excel and Google Sheets. The list includes quick-start guides, tutorials, and more. The examples in this course use Google Sheets, but you can follow along using Excel or any other spreadsheet application. The user interface might be a little different, but it should look and work similarly.



## **Microsoft Excel**

* [Office Quick Starts](https://support.microsoft.com/en-us/office/office-quick-starts-25f909da-3e76-443d-94f4-6cdf7dedc51e#ID0EAADAAA=At_work_or_school): Scroll down to the Downloadable guides section to download the Excel Quick Start Guide: This PDF guide begins with a labeled map of Excel that can guide you through the basic tasks you can accomplish in Excel. For tips on starting and opening Excel, this [Microsoft Support page](https://support.microsoft.com/en-us/office/create-a-new-workbook-ae99f19b-cecb-4aa0-92c8-7126d6212a83?wt.mc_id=otc_excel) will show you how to begin a new workbook.
* [Excel video training](https://support.microsoft.com/en-us/office/excel-for-windows-training-9bc05390-e94c-46af-a5b3-d7c22f6990bb?wt.mc_id=otc_home): This is a collection of step-by-step videos to use all sorts of Excel features, including adding and working within rows, columns, and cells; formatting; using formulas and functions; and adding charts and pivot tables.
* [Sort data in a range or table](https://support.microsoft.com/en-us/office/sort-data-in-a-range-or-table-62d0b95d-2a90-4610-a6ae-2e545c4a4654): This page guides you through all of the steps you will need to sort data by number, text, and color. You’ll also have the option to sort by custom list so that you can customize exactly what you want to sort.
* [Filter data in a range or table](https://support.microsoft.com/en-us/office/filter-data-in-a-range-or-table-01832226-31b5-4568-8806-38c37dcc180e): This article has step-by-step instructions on how to filter an Excel spreadsheet to show only the data you want to see. You can also use built-in comparison operators, such as “greater than” and “top 10” to reveal only the most relevant data.
* [Format a worksheet](https://support.microsoft.com/en-us/office/quick-start-format-a-worksheet-d70f75a2-23e6-4c92-83d6-2f219e4ad42e): The guide will help you select and format your Excel spreadsheet, then change the borders, shading, colors, and text. This can help improve your spreadsheet’s readability.

Pro tip: If you’re searching for information about using customizable options, check out Microsoft’s [Guidelines for organizing and formatting data on a worksheet](https://support.microsoft.com/en-us/office/guidelines-for-organizing-and-formatting-data-on-a-worksheet-90895cad-6c85-4e02-90d3-8798660166e3). This article provides clear methods for creating easy-to-read spreadsheets.

## **Google Sheets**

* [Google Sheets cheat sheet](https://support.google.com/a/users/answer/9300022): The cheat sheet puts all the basics of Sheets on a single page for easy reference. Here, you can learn about customizing your spreadsheet and the data inside; working with rows, columns, and cells; sharing your spreadsheet with others; creating different versions and copies of a spreadsheet; and more.
* [Get started with Sheets: Create and import files](https://support.google.com/a/users/answer/9300311?hl=en&ref_topic=9296423): This guide is a step-by-step guide for working with Sheets. You start by learning how to open a spreadsheet, then move on to adding data.
* [Sort and filter your data](https://support.google.com/docs/answer/3540681?co=GENIE.Platform%3DDesktop&hl=en): This resource can help you organize data in Sheets. Use this guide to sort part or all of a spreadsheet. You can sort by text, number, and color. Then, learn how to create filters to show only certain data while hiding the rest. Finally, the article includes information on creating, saving, and removing a filter view.
* [Edit and format a spreadsheet](https://support.google.com/docs/answer/46973?co=GENIE.Platform%3DDesktop&hl=en&oco=0): This will help you make easy-to-read spreadsheets. You will learn how to assign a color, customize borders around cells, and change the appearance of text. If you’d like to give your spreadsheet a theme, you can scroll to the bottom of the page and find how to apply it to parts of your spreadsheet.

Tip: Microsoft Excel and Google Sheets are very similar in terms of calculations, formulas, functions, and many other features. But there are some differences, which can make it tricky to switch from one to the other. If you are moving between Excel and Google Sheets, find a quick list of the differences between the two kinds of spreadsheet applications in [Overview: Differences between Sheets and Excel](https://support.google.com/a/users/answer/9331278?hl=en).

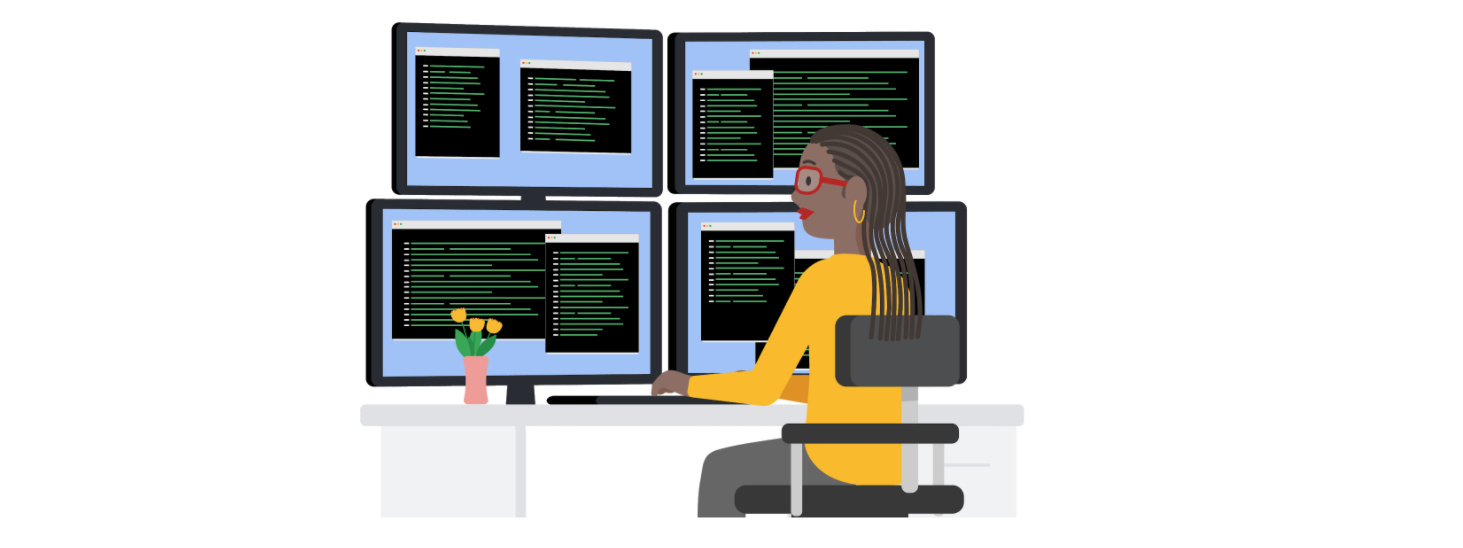
**FORMULAS IN SPREADSHEETS**

[**STEP-BY-STEP: FORMULAS FOR SUCCESS**](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/dr2GC/step-by-step-formulas-for-success)

[**FORMULAS FOR SUCCESS**](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/s4RlB/formulas-for-success)

[**QUICK REFERENCE: FORMULAS IN SPREADSHEETS**](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/ASfb7/quick-reference-formulas-in-spreadsheets)

# Quick Reference: Formulas in spreadsheets



You have been learning a lot about spreadsheets and all kinds of time-saving calculations and organizational features they offer. One of the most valuable spreadsheet features is a formula. As a quick reminder, a formula is a set of instructions that does a specific calculation using the data in a spreadsheet. Formulas make it easy for data analysts to do powerful calculations automatically, which helps them analyze data more effectively. Below is a quick-reference guide to help you get the most out of formulas.

## **Formulas**

### **The basics**

* When you enter a formula in math, it generally ends with an equal sign (2 + 3 = ?). But with formulas, they always start with one instead (=A2+A3). The equal sign tells the spreadsheet that what follows is part of a formula, not just a word or number in a cell.
* After you enter the equal sign, most spreadsheet applications will display an autocomplete menu that lists valid formulas, names, and text strings. This is a great way to create and edit formulas while avoiding typing and syntax errors.
* A fun way to learn new formulas is just by typing an equal sign and a single letter of the alphabet. Choose one of the options that pops up and you will learn what that formula does.

### **Mathematical operators**

* The mathematical operators used in spreadsheet formulas include:
* Subtraction – minus sign ( - )
* Addition – plus sign ( + )
* Division – forward-slash ( / )
* Multiplication – asterisk ( \* )

### **Auto-filling**

The lower-right corner of each cell has a fill handle. It is a small *green square* in Microsoft Excel and a small *blue circle* in Google Sheets.

* Click the fill handle square or circle for a cell and drag it down a column to auto-fill other cells in the column with the same value or formula in that cell.
* Click the fill handle square or circle for a cell and drag it across a row to auto-fill other cells in the row with the same value or formula in that cell.
* If you want to create a numbered sequence in a column or row, do the following: 1) Fill in the first two numbers of the sequence in two adjacent cells, 2) Select to highlight the cells, and 3) Drag the fill handle square or circle to the last cell to complete the sequence of numbers. For example, to insert 1 through 100 in each row of column A, enter 1 in cell A1 and 2 in cell A2. Then, select to highlight both cells, click the fill handle square or circle in cell A2, and drag it down to cell A100. This auto-fills the numbers sequentially so you don't have to enter them in each cell.

### **Absolute referencing**

* Absolute referencing is marked by a dollar sign ($). For example, =$A$10 has absolute referencing for both the column and the row value
* Relative references (which is what you normally do, e.g. “=A10”) will change anytime the formula is copied and pasted. They are in relation to where the referenced cell is located. For example if you copied “=A10” to the cell to the right it would become “=B10”. With absolute referencing “=$A$10” copied to the cell to the right would remain “=$A$10”. But if you copied $A10 to the cell below, it would change to $A11 because the row value isn't an absolute reference.
* Absolute references will not change when you copy and paste the formula in a different cell. The cell being referenced is always the same.
* To easily switch between absolute and relative referencing in the formula bar, highlight the reference you want to change and press the F4 key; for example, if you want to change the absolute reference, $A$10, in your formula to a relative reference, A10, highlight $A$10 in the formula bar and then press the F4 key to make the change.

### **Data range**

* When you click into your formula, the colored ranges let you see which cells are being used in your spreadsheet. There are different colors for each unique range in your formula.
* In a lot of spreadsheet applications, you can press the F2 (or Enter) key to highlight the range of data in the spreadsheet that is referenced in a formula. Click the cell with the formula, and then press the F2 (or Enter) key to highlight the data in your spreadsheet.

### **Combining with functions**

* COUNTIF() is a formula and a function. This means the function runs based on criteria set by the formula. In this case, COUNT is the formula; it will be executed IF the conditions you create are true. For example, you could use =COUNTIF(A1:A16, “7”) to count only the cells that contained the number 7. Combining formulas and functions allows you to do more work with a single command.

[**HANDS-ON ACTIVITY: DATA ANALYSIS AND FORMULAS: BAKERY SALES INSIGHTS**](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/Yxy6K/hands-on-activity-data-analysis-and-formulas-bakery-sales-insights)

**[SPREADSHEET ERRORS AND FIXES](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/VbM4p/spreadsheet-errors-and-fixes)**

**[MORE ABOUT SPREADSHEET ERRORS AND FIXES](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/1sjGm/more-about-spreadsheet-errors-and-fixes)**

**[HANDS-ON ACTIVITY: RESOLVE SPREADSHEET ERRORS](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/37ePh/hands-on-activity-resolve-spreadsheet-errors)**

[**TEST YOUR KNOWLEDGE ON USING FORMULAS IN SPREADSHEETS**](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/QwB0w/test-your-knowledge-on-using-formulas-in-spreadsheets)

**FUNCTIONS IN SPREADSHEETS**

**[STEP-BY-STEP: FUNCTIONS 101](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/MAdSM/step-by-step-functions-101)**

**[FUNCTIONS 101](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/BO2Ql/functions-101)**

**[QUICK REFERENCE: FUNCTIONS IN SPREADSHEETS](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/EaHLl/quick-reference-functions-in-spreadsheets)**

**[HANDS-ON ACTIVITY: CREATE A CUSTOM DATA TABLE](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/bB5EY/hands-on-activity-create-a-custom-data-table)**

[**TEST YOUR KNOWLEDGE ON USING FUNCTIONS IN SPREADSHEETS**](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/c3vT8/test-your-knowledge-on-using-functions-in-spreadsheets)

**SAVE TIME WITH STRUCTURED THINKING**

**[BEFORE SOLVING A PROBLEM, UNDERSTAND IT](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/F50J1/before-solving-a-problem-understand-it)**

**[SCOPE OF WORK AND STRUCTURED THINKING](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/S6uVY/scope-of-work-and-structured-thinking)**

**[CREATING A SCOPE OF WORK](https://www.coursera.org/learn/ask-questions-make-decisions/ungradedWidget/FqQb9/creating-a-scope-of-work)**

**[HANDS-ON ACTIVITY: CREATE A SCOPE OF WORK](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/IEJTe/hands-on-activity-create-a-scope-of-work)**

**[STAYING OBJECTIVE](https://www.coursera.org/learn/ask-questions-make-decisions/lecture/YQw5K/staying-objective)**

**[THE IMPORTANCE OF CONTEXT](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/VijfZ/the-importance-of-context)**

**[SELF-REFLECTION: WORK WITH DATASETS](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/rSHf2/self-reflection-work-with-datasets)**

[**TEST YOUR KNOWLEDGE ON STRUCTURED THINKING**](https://www.coursera.org/learn/ask-questions-make-decisions/quiz/VA5ym/test-your-knowledge-on-structured-thinking)

**MODULE 3 CHALLENGE**

**[GLOSSARY TERMS FROM MODULE 3](https://www.coursera.org/learn/ask-questions-make-decisions/supplement/aZ5ss/glossary-terms-from-module-3)**

**[MODULE 3 CHALLENGE](https://www.coursera.org/learn/ask-questions-make-decisions/exam/Oocv7/module-3-challenge)**