- Excel 1 -
An Introduction to Excel 2013

Winter 2018

René Duplain | Sarah Simpkin

Download files

Part 1 - How to work with tables.

- Follow along with the instructors to learn the basics of working with tables in Excel.
- For future reference, download this table to view examples used: https://login.proxy.bib.uottawa.ca/login?url=http://gsg.uottawa.ca/geo-license/workshops/2018/Excel1/Table_Examples.xlsx

Part 2 - Hands-on exercise in Excel

- To follow along this hands-on exercise, please download the **Groceries** spreadsheet (original version) and open it in Excel.
  - Original version: https://login.proxy.bib.uottawa.ca/login?url=http://gsg.uottawa.ca/geo-license/workshops/2017/Fall/Excel-erate_your_spreadsheet/Groceries-original.xlsx
- For convenience, a completed (post-workshop) version of this spreadsheet has also been provided for later revision.
  - Completed version: https://login.proxy.bib.uottawa.ca/login?url=http://gsg.uottawa.ca/geo-license/workshops/2017/Fall/Excel-erate_your_spreadsheet/Groceries-complete.xlsx

PART 2 - HANDS-ON EXERCISE IN EXCEL

A. Ribbon menu

Before jumping into using Excel, it's worth taking a quick look at the various menus, buttons, and tabs available in the ribbon at the top.

Here is a breakdown of what each menu contains:

1. HOME - Common actions such as formatting, copying, pasting, inserting, and deleting rows and columns.
2. INSERT - Commands that enable you to insert objects such as charts and shapes into your spreadsheets.
3. PAGE LAYOUT - Enable you to determine how your spreadsheet looks, both onscreen and when printed, and control options such as theme colours, page margins, and print area.
4. FORMULAS - Commands that help define, control, and audit Excel formulas.
5. DATA - Commands that enable you to connect to external data, as well as manage the data in your spreadsheet.
6. REVIEW - Commands that protect data integrity in your spreadsheet, such as Spell Check, Protect Sheet, Protect Workbook, and Track Changes.
7. VIEW - Commands designed to help you control how you visually interact with your spreadsheet.

[Adapted from http://www.informit.com/articles/article.aspx?p=2067634.]

Note the following features:

- Formatting tools inside the HOME ribbon, including several that you may recognize from other Microsoft Office products.
- A Formula bar showing the contents of the highlighted cell (more on this soon).

- A grid of cells where data are stored. The data include dates, text, and numbers.
- Columns identified with letters (A, B, C, etc.) running along the top row of the sheet.
- Rows identified with numbers (1, 2, 3, etc.) running down the left side of the sheet.
- A tab at the bottom of the page showing the name of the sheet, "Sheet1".
- A tool for zooming in and out of the data on the bottom right side.

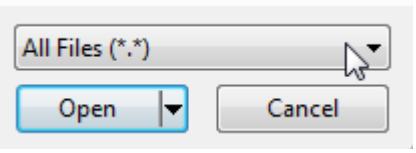
B. Excel basics

Opening a file

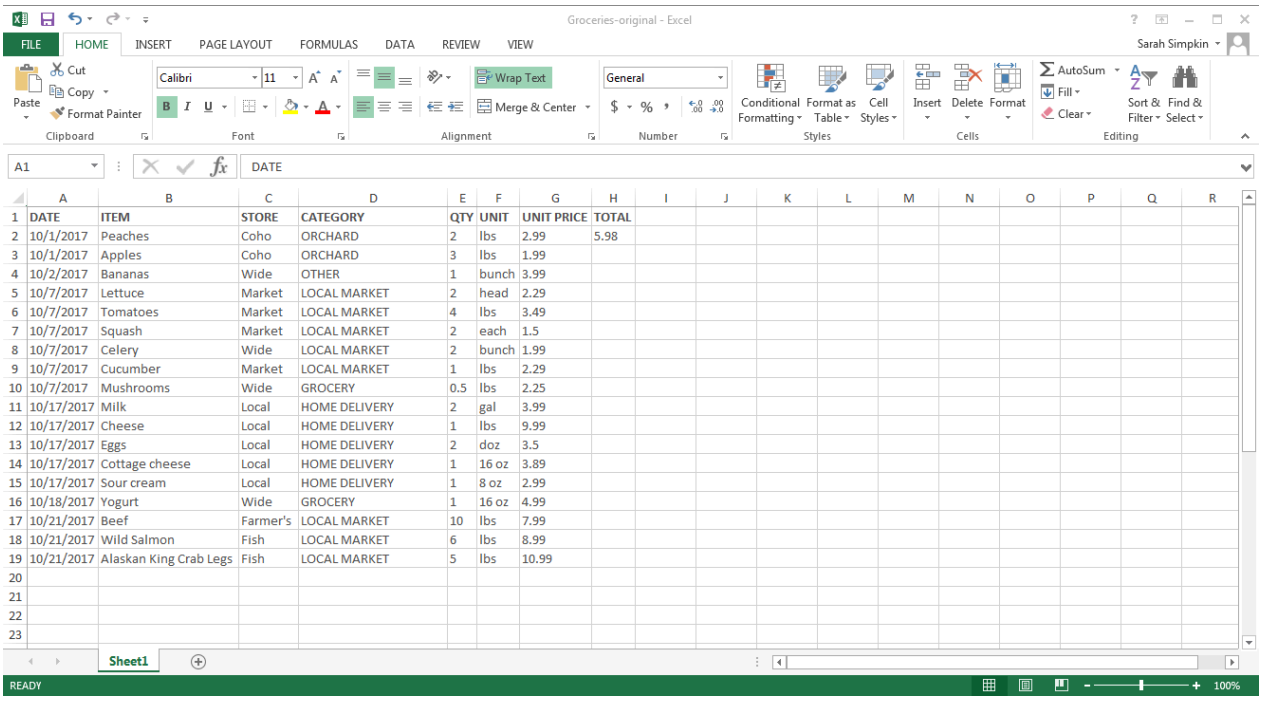
Microsoft Excel is a popular application for building spreadsheets and graphing data. By default, Excel documents have a .xls or .xlsx extension. However, Excel can also read other file extensions, including comma separated value (.csv) or text (.txt).

In this example, we will import a .csv file into Excel.

1 - Open the .csv version of the **Groceries** spreadsheet (see top page for download link). Excel may not display the .csv file right away. To view all available files in a folder, select “All Files (*.*)” in the drop-down menu at the bottom of the open screen.

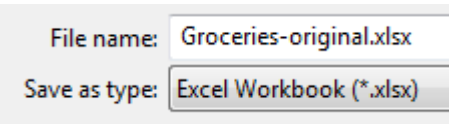


2 - Groceries-original.csv should now appear in the list of available files. Select it and click Open. This is how the spreadsheet should appear in Excel 2013 on a Windows machine. Your version of Excel may look slightly different, but the main components should be similar.



	A	B	C	D	E	F	G	H
1	DATE	ITEM	STORE	CATEGORY	QTY	UNIT	UNIT PRICE	TOTAL
2	10/1/2017	Peaches	Coho	ORCHARD	2	lbs	2.99	5.98
3	10/1/2017	Apples	Coho	ORCHARD	3	lbs	1.99	
4	10/2/2017	Bananas	Wide	OTHER	1	bunch	3.99	
5	10/7/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29	
6	10/7/2017	Tomatoes	Market	LOCAL MARKET	4	lbs	3.49	
7	10/7/2017	Squash	Market	LOCAL MARKET	2	each	1.5	
8	10/7/2017	Celery	Wide	LOCAL MARKET	2	bunch	1.99	
9	10/7/2017	Cucumber	Market	LOCAL MARKET	1	lbs	2.29	
10	10/7/2017	Mushrooms	Wide	GROCERY	0.5	lbs	2.25	
11	10/17/2017	Milk	Local	HOME DELIVERY	2	gal	3.99	
12	10/17/2017	Cheese	Local	HOME DELIVERY	1	lbs	9.99	
13	10/17/2017	Eggs	Local	HOME DELIVERY	2	doz	3.5	
14	10/17/2017	Cottage cheese	Local	HOME DELIVERY	1	16 oz	3.89	
15	10/17/2017	Sour cream	Local	HOME DELIVERY	1	8 oz	2.99	
16	10/18/2017	Yogurt	Wide	GROCERY	1	16 oz	4.99	
17	10/21/2017	Beef	Farmer's	LOCAL MARKET	10	lbs	7.99	
18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99	
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99	
20								
21								
22								
23								

3 - To take advantage of all the formatting options available in Excel, we will save this .csv file as an .xlsx. Click File → Save As and select “Excel Workbook (*.xlsx)” as the file type. Click Save.



Editing cells

4 - Cells may be selected and edited. Use your mouse to navigate to cell **E2**, then type “3” to change the number of peaches from 2 to 3.

	A	B	C	D	E	F	G	H
1	DATE	ITEM	STORE	CATEGORY	QTY	UNIT	UNIT PRICE	TOTAL
2	10/1/2017	Peaches	Coho	ORCHARD	2	lbs	2.99	5.98

Notice how this edit also changes the information displayed in the Formula bar:

As well as the result of the calculation performed in cell **H2**:

E	F	G	H
QTY	UNIT	UNIT PRICE	TOTAL
3	lbs	2.99	8.97

5 - Next, we’ll update the spreadsheet to include additional purchases from the fish store. Highlight row 20 by clicking on the number **20** on the leftmost column:

18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99
20							
21							

Right-click, then choose “Insert” to add an additional row. Do this once more.

6 - Fill in the following information:

18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99
20	10/21/2017	Cod Fillets			5	each	5.99
21	10/21/2017	Tuna Steaks			2	lbs	17.99

7 - Excel has a shortcut feature for automatically filling in data from adjacent rows and columns. Since both of our new items are also from the fish store and are categorized as local market items, we can fill in those fields by single clicking on cells C19 and C20 to select them. Hover over the bottom right corner of the selected fields until the cursor turns into a plus sign.

18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99
20	10/21/2017	Cod Fillets				each	5.99
21	10/21/2017	Tuna Steaks			2	lbs	17.99

Drag down from the plus sign to complete the remaining cells.

18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99
20	10/21/2017	Cod Fillets	Fish	LOCAL MARKET	5	each	5.99
21	10/21/2017	Tuna Steaks	Fish	LOCAL MARKET	2	lbs	17.99

8 - Cells can also be copied and pasted. Let's imagine that the spreadsheet creator returned to the market on October 21st to buy more lettuce. Click on row **5** on the far left side to select the row, then use Control-C (Command-C on a Mac) to copy the content of the row.

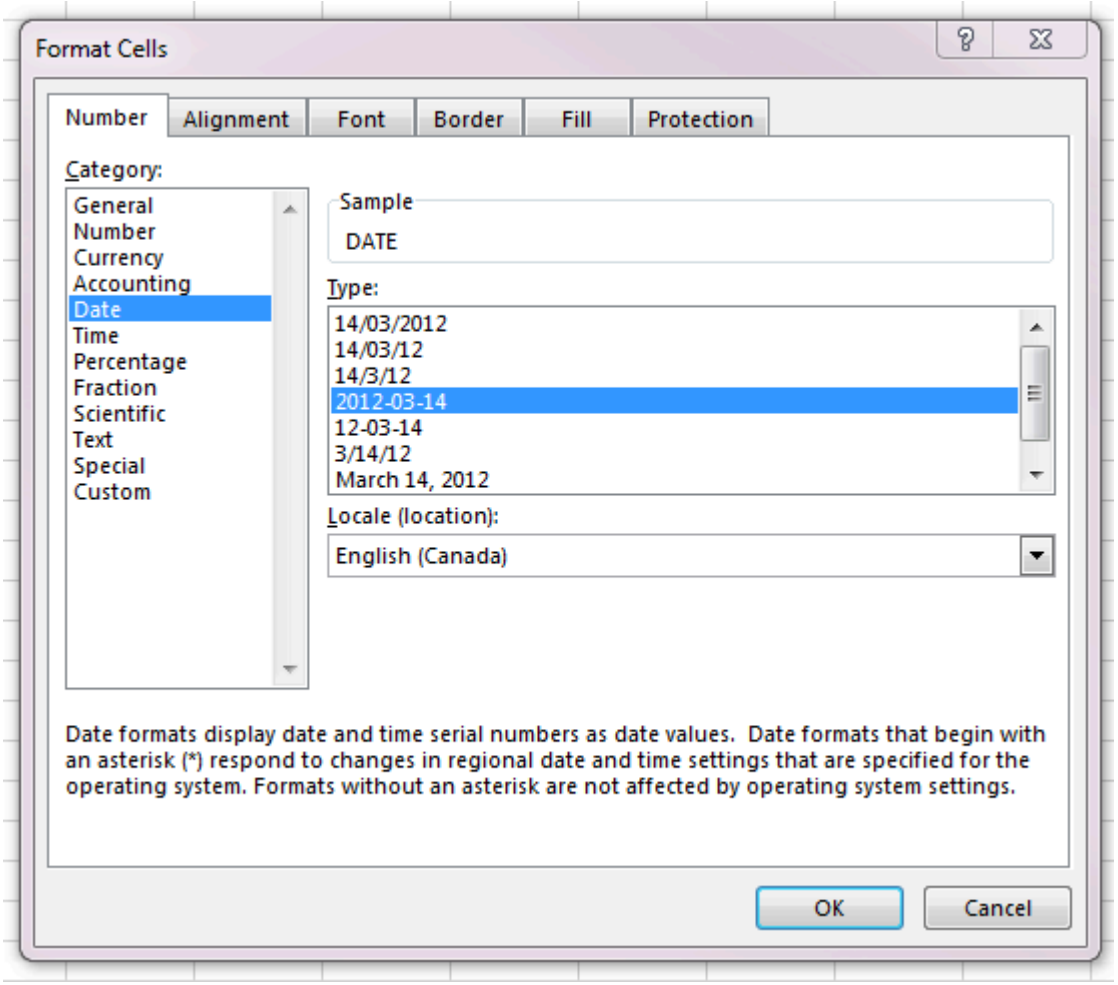
	A	B	C	D	E	F	G	H	I
1	**DATE**	**ITEM**	**STORE**	**CATEGORY**	**QTY**	**UNIT**	**UNIT PRICE**	**TOTAL**	
2	10/1/2017	Peaches	Coho	ORCHARD	3	lbs	2.99	8.97	
3	10/1/2017	Apples	Coho	ORCHARD	3	lbs	1.99		
4	10/2/2017	Bananas	Wide	OTHER	1	bunch	3.99		
5	10/7/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29		
6	10/7/2017	Tomatoes	Market	LOCAL MARKET	4	lbs	3.49		

Next, select the target cell where the information will be (**A22**). Type Control-V (Command-V on a Mac) to paste the data into the row. Finally, update the date of the new row to October 21, 2017.

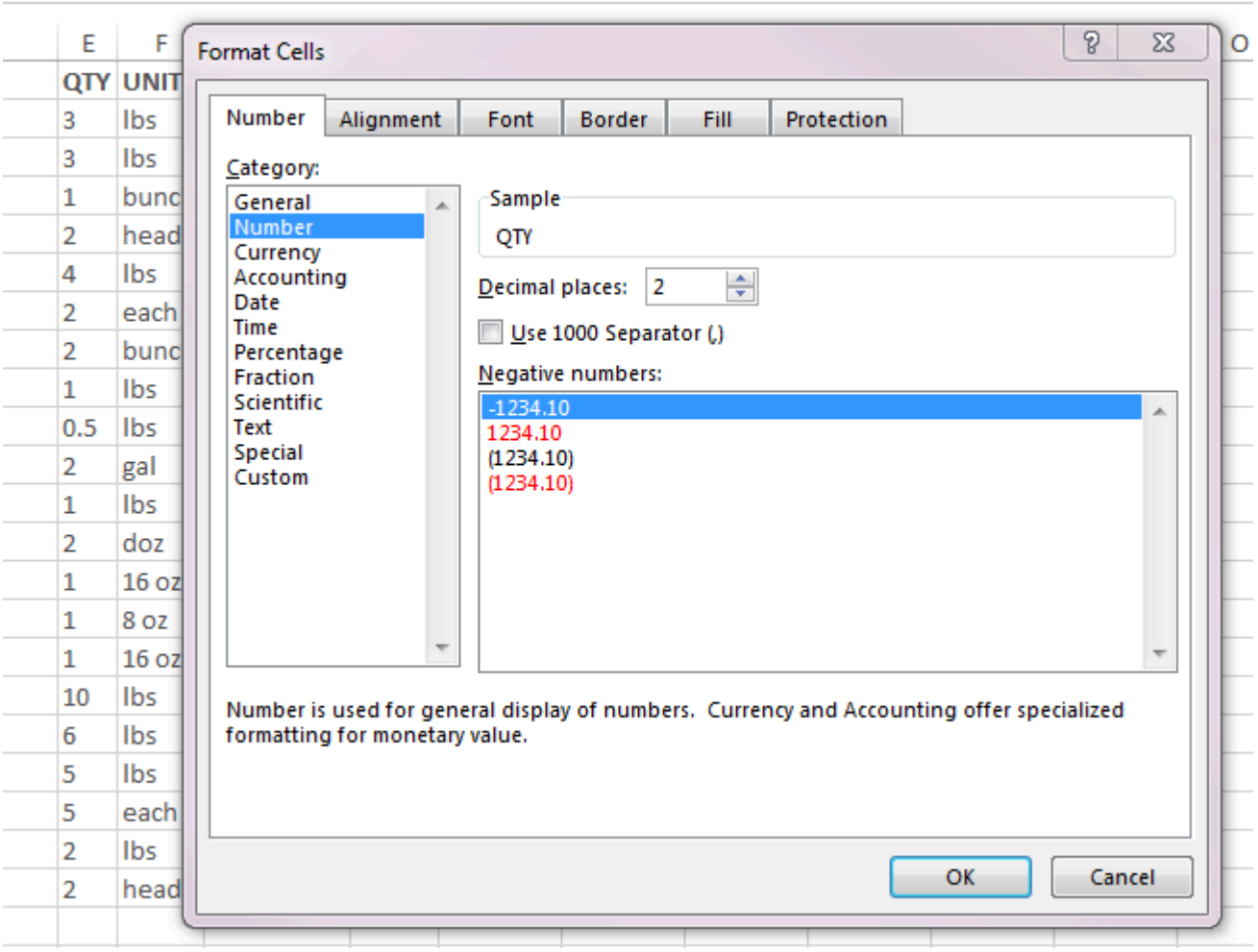
20	10/21/2017	Cod Fillets	Fish	LOCAL MARKET	5	each	5.99
21	10/21/2017	Tuna Steaks	Fish	LOCAL MARKET	2	lbs	17.99
22	10/21/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29

TIP: To paste cells into empty rows that haven't been created yet, click on the cell after the location you wish to copy the data. Then, right click and select "Insert Copied Cells".

9 - Depending on your computer's settings, the dates may be written in the American style of MM/DD/YYYY. We can change the appearance of the dates by selecting column **A** and choosing "Format Cells". Use the options available in the "Date" category to change how the dates are displayed.



The Format Cells menu is also useful for ensuring that numeric data is found within numeric cells. To set the format of the numeric cells on the spreadsheet, select the columns you wish to convert (**E**, **G**, and **H**) and use Format Cells to set them to “Number”.

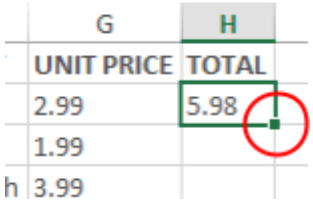


Calculations and functions

10 - One of the most common uses of Excel is to perform a calculation using values stored in other cells. Excel will recognize that you are performing a calculation—or inserting a function (more on this soon)—when you start the value of a cell with an equal sign ("="). You can see an example of this by clicking on **H2** and examining the Formula bar:

In this instance, the value of cell H2 will be the result of the multiplication between cells G2 and E2 (and asterisk * is the symbol for multiplication). Or, in other words, the total price of the peaches has been calculated by multiplying the value in the quantity column by the unit price.

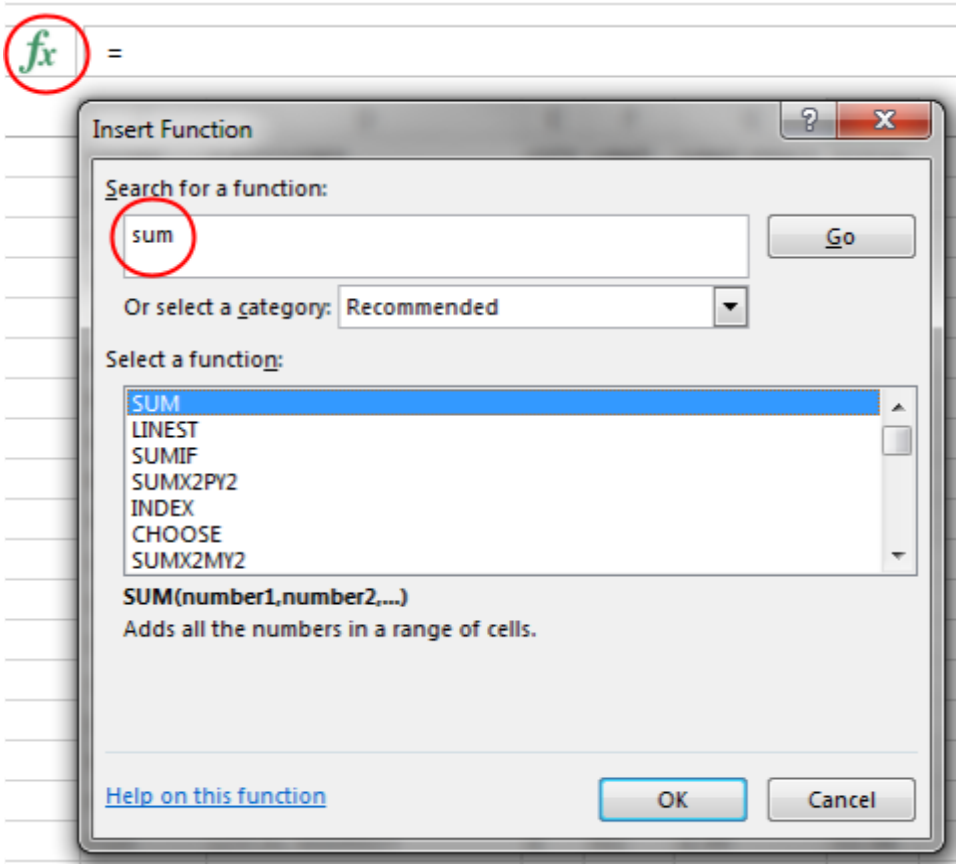
Use the automatic fill tool described in Step 6 to complete this calculation for each row by clicking on the H2 cell and double-clicking on the small black square in the lower right corner of the cell. Excel will automatically alter the calculation to reflect which row to pull the data from (e.g. row 3 will multiply cells G3 and E3, row 4 will multiply cells G4 and E4, etc).



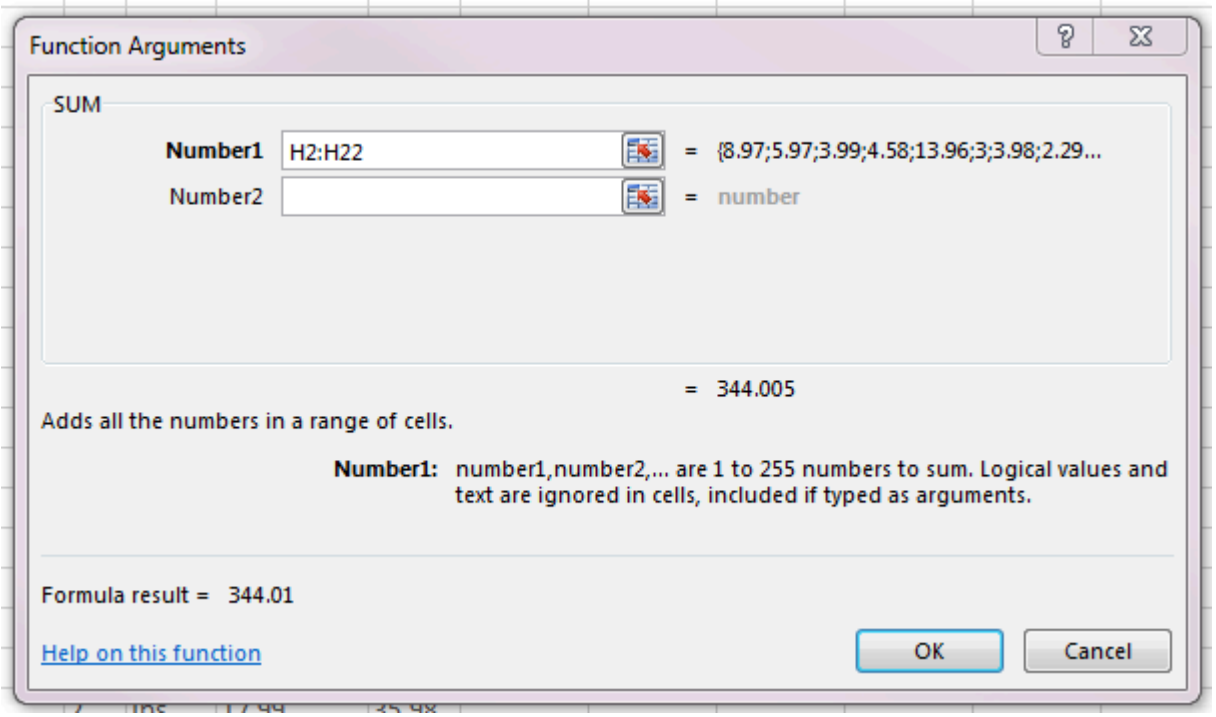
	A	B	C	D	E	F	G	H
1	DATE	ITEM	STORE	CATEGORY	QTY	UNIT	UNIT PRICE	TOTAL
2	10/1/2017	Peaches	Coho	ORCHARD	3	lbs	2.99	8.97
3	10/1/2017	Apples	Coho	ORCHARD	3	lbs	1.99	5.97
4	10/2/2017	Bananas	Wide	OTHER	1	bunch	3.99	3.99
5	10/7/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29	4.58
6	10/7/2017	Tomatoes	Market	LOCAL MARKET	4	lbs	3.49	13.96
7	10/7/2017	Squash	Market	LOCAL MARKET	2	each	1.50	3.00
8	10/7/2017	Celery	Wide	LOCAL MARKET	2	bunch	1.99	3.98
9	10/7/2017	Cucumber	Market	LOCAL MARKET	1	lbs	2.29	2.29
10	10/7/2017	Mushrooms	Wide	GROCERY	0.5	lbs	2.25	1.13
11	10/17/2017	Milk	Local	HOME DELIVERY	2	gal	3.99	7.98
12	10/17/2017	Cheese	Local	HOME DELIVERY	1	lbs	9.99	9.99
13	10/17/2017	Eggs	Local	HOME DELIVERY	2	doz	3.50	7.00
14	10/17/2017	Cottage cheese	Local	HOME DELIVERY	1	16 oz	3.89	3.89
15	10/17/2017	Sour cream	Local	HOME DELIVERY	1	8 oz	2.99	2.99
16	10/18/2017	Yogurt	Wide	GROCERY	1	16 oz	4.99	4.99
17	10/21/2017	Beef	Farmer's	LOCAL MARKET	10	lbs	7.99	79.90
18	10/21/2017	Wild Salmon	Fish	LOCAL MARKET	6	lbs	8.99	53.94
19	10/21/2017	Alaskan King Crab Legs	Fish	LOCAL MARKET	5	lbs	10.99	54.95
20	10/21/2017	Cod Fillets	Fish	LOCAL MARKET	5	each	5.99	29.95
21	10/21/2017	Tuna Steaks	Fish	LOCAL MARKET	2	lbs	17.99	35.98
22	10/21/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29	4.58

11 - Next, we will insert a function to calculate the sum of all of the items in the TOTAL column.

Select the first empty cell at the bottom of the TOTAL column. This is where the total cost of all of the items will go. Next, click the  button to bring up the Insert Function menu. This window will allow you to look up common functions and search for functions. Click on or search for “sum”.



Once SUM has been clicked, you'll see a second window called Function Arguments. This is where you can define the fields required for any given formula. In this example, Excel has guessed that we would like to add up the values found in a range of cells, from H2 to H22. This is displayed as **H2:H22**. Click OK.



Once the value has been calculated, it will be visible in **H23**.

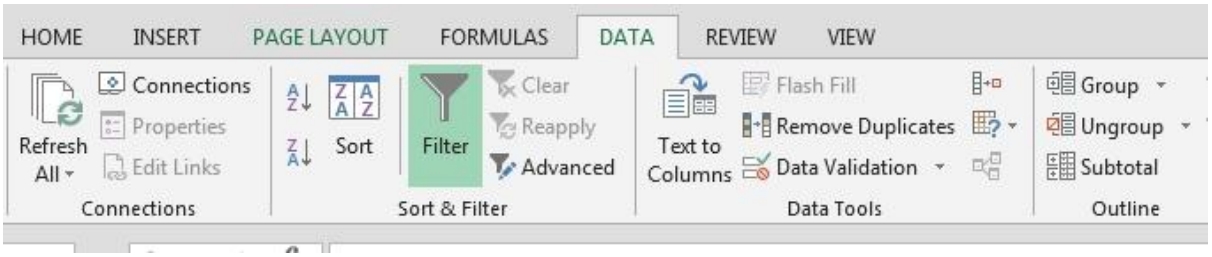
22	10/21/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29	4.58
23								344.01

Break!

C. Filtering and sorting

Filtering can be used to examine a subset of our data. For example, to find out which groceries were purchased at the Fish Market, we can follow these steps:

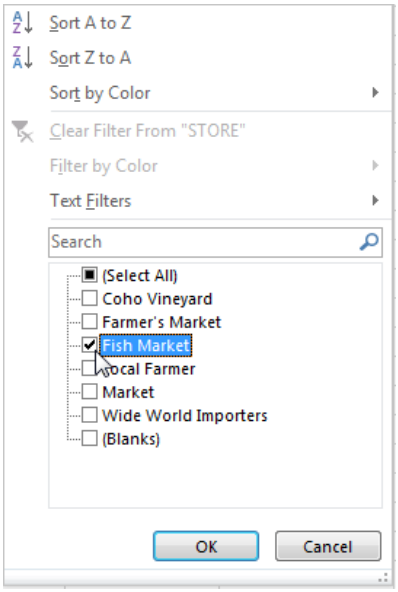
12 - Select the dataset. In the top menu, click the DATA tab, then click on Filter.



13 - You should now see drop down arrows ( ) next to the column names, like this:

	A	B	C	D	E	F	G	H
1	DATE	ITEM	STORE	CATEGORY	QTY	UNIT	UNIT PRI	TOT
2	01/10/2017	Peaches	Coho Vineyard	ORCHARD	3	lbs	2.99	8.97
3	01/10/2017	Apples	Coho Vineyard	ORCHARD	3	lbs	1.99	5.97
4	02/10/2017	Bananas	Wide World	OTHER	1	bunch	3.99	3.99
5	07/10/2017	Lettuce	Market	LOCAL MARKET	2	head	2.29	4.58
6	07/10/2017	Tomatoes	Market	LOCAL MARKET	4	lbs	3.49	13.96
7	07/10/2017	Squash	Market	LOCAL MARKET	2	each	1.50	3.00
8	07/10/2017	Celery	Wide World	LOCAL MARKET	2	bunch	1.99	3.98

14 - Clicking on one of these arrows will allow you to filter in/out certain records for that column. Click all the checkboxes off except for Fish Market.



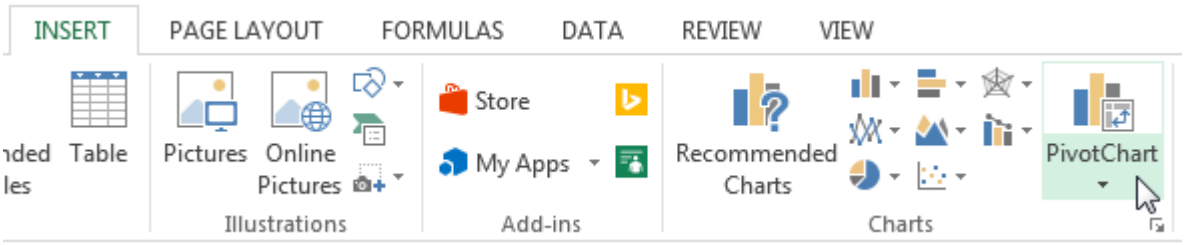
15 - Your table should now look like this:

	A	B	C	D	E	F	G	H
1	DATE	ITEM	STORE	CATEGORY	QTY	UNIT	UNIT PRI	TOT
18	21/10/2017	Wild Salmon	Fish Market	LOCAL MARKET	6	lbs	8.99	53.94
19	21/10/2017	Alaskan King	Fish Market	LOCAL MARKET	5	lbs	10.99	54.95
20	21/10/2017	Cod Fillets	Fish Market	LOCAL MARKET	5	each	5.99	29.95
21	21/10/2017	Tuna Steaks	Fish Market	LOCAL MARKET	2	lbs	17.99	35.98

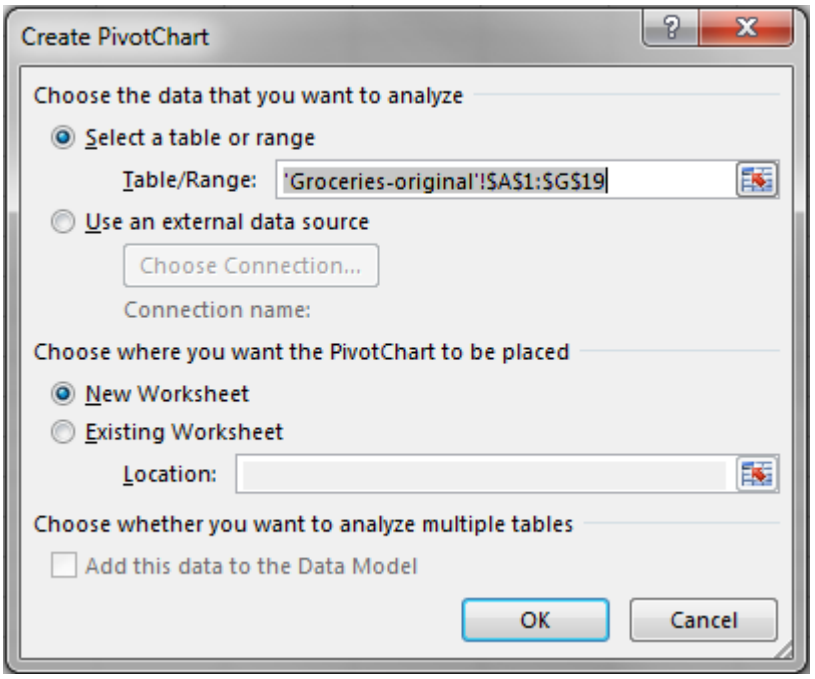
D. Graphing

16 - The PivotChart function under PivotTable tools allows you to quickly and easily graph your PivotTable and customize it to your needs. This graph is dynamically updated as you make changes. We will use data from the table above to produce a graph showing our spending at each location.

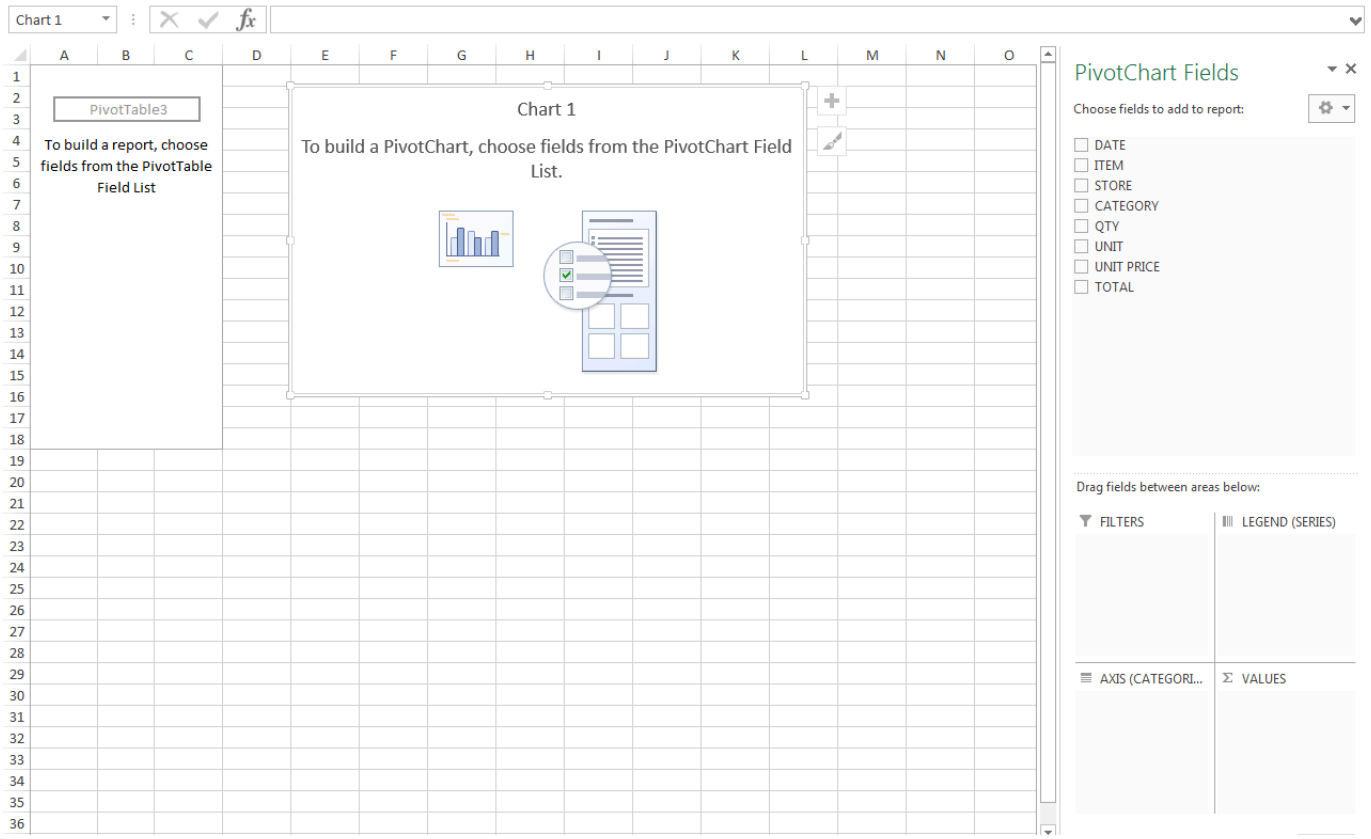
17 - Click on PivotChart in the INSERT ribbon.



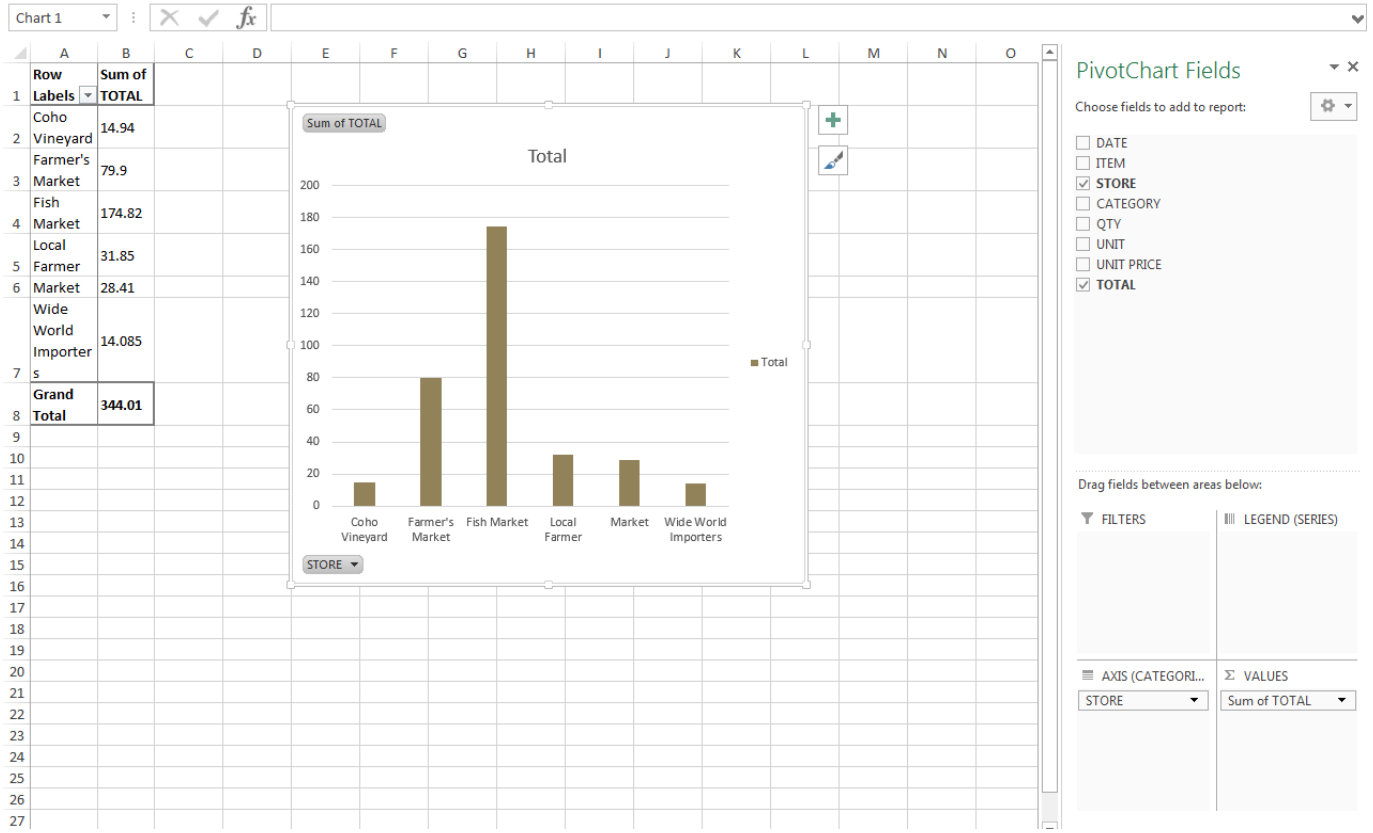
18 - The Create PivotChart window allows you to choose the rows and columns you wish to include for graphing your data. Leave the default settings and select New Worksheet. Click OK.



19 - The PivotChart layout looks as follows.



20 - Note the column names are displayed on the right-hand window. These can be checked on/off to view them in the PivotChart. Check on STORE and TOTAL to create a graph showing the total amount spent at each store. (Wow, that was easy!)



Guidelines for choosing a graph

The National Centre for Education Statistics has assembled a basic guide for determining which graphs and charts to use for which kind of data. They state that:

- **Line graphs** are used to track changes over short and long periods of time. When smaller changes exist, line graphs are better to use than bar graphs. Line graphs can also be used to compare changes over the same period of time for more than one group.
- **Pie charts** are best to use when you are trying to compare parts of a whole. They do not show changes over time.
- **Bar graphs** are used to compare things between different groups or to track changes over time. However, when trying to measure change over time, bar graphs are best when the changes are larger.
- **Area graphs** are very similar to line graphs. They can be used to track changes over time for one or more groups. Area graphs are good to use when you are tracking the changes in two or more related groups that make up one whole category (for example public and private groups).
- **X-Y plots** are used to determine relationships between the two different things. The x-axis is used to measure one event (or variable) and the y-axis is used to measure the other. If both variables increase at the same time, they have a positive relationship. If one variable decreases while the other increases, they have a negative relationship. Sometimes the variables don't follow any pattern and have no relationship.

Keep in mind that effective visualizations are:

- **Novel** → stimulate different ways of thinking
- **Informative** → serve as a starting point for new analysis
- **Efficient** → summarize data efficiently / communicate findings effectively
- **Aesthetically pleasing**→ engage your audience