

The Basics and Sorting in Excel

Work through this exercise to review formulas and sorting in Excel.

Every journalist will deal with a budget at some point. For a budget story, typically we write about a total increase or decrease from the previous year, interview the mayor and be done. With just a few calculations, we can elevate a boring budget story and tell taxpayers things they may not know.

Let's open citybudget.xls. There are a few steps that should be done with every spreadsheet before we start messing with it.

1. Make a copy
2. Four corners test
3. Check the math

1. Make a copy. As soon as you get data from a government agency, a copy should be made. On your computer, there should be an "Original" folder where the virgin copy is kept and a "Working" folder where the copy with all the calculations is stored. Mistakes will be made. Numbers deleted, which is why an original copy is so important to have on hand.

2. Four corners test. You want to see how many columns and how many rows of data are in the spreadsheet. On the surface, it may appear that a spreadsheet just has five columns of data, but some government officials have left data in columns X, Y and Z, which isn't immediately visible. To check the four corners, hold the Ctrl key and use the arrows to go left, right, up and down. It's a great way to see how many rows of data are in the spreadsheet too. To get to the bottom of a sheet you can also hold Fn+Ctrl+→. To go back to the top, FN+Ctrl+←.

3. Check the math. During the four corners test, you should be able to identify any calculations that the government agency may have done. The past has taught us to check the math. For example, look at the totals found in row 16 of this spreadsheet. First, click on cell B16 to see if there is a formula for the total. (Hint: The formula will appear in the **Formula Bar**.) There isn't so let's check the math.

TOTAL

Any formula will always start with = . You also want to label any calculations in order to remember what you put where. Type "MyTotal" in A17.

The formula goes in B17. A few notes: the formula is not case sensitive. In this case, Excel is asking for a range. So we must give the first cell where the data appears that we want to add

together: B2. We then type : to indicate a range and B14 for the last cell of data. The second) is not necessary. You can just hit enter after typing “b14”.

In this case, to get the total the formula is =SUM(b2:b14)

Departments	This year	Nex
City Council	105,207	
City Clerk	70,778	
City Manager	182,540	1
Municipal Court	195,645	2
Personnel	191,116	1
Planning and Community Development	305,607	3
Fire Department	2,456,789	2.5
Police Department	3,101,345	3.5
Public Works	2,156,987	2.1
Community Services	85,654	
General City Fund	1,234,823	1.4
Parks and Recreation	1,400,400	1.2
Health	1,033,188	1.1
Totals	12,520,079	13.8
MyTotal	=Sum(b2:b14)	

You can either type the formula again in C17 or save some keystrokes and use the copy tool. Put the cursor on the lower right black box.

12,520,079	13,840,904
12,520,079	

Once the black plus sign appears, click, hold and drag over to C17 until you see the gray outline in the cell and let go.

12,520,079	13,840,904
12,520,079	

It should automatically total C2 through C14 and we see that the city’s math is incorrect.

DIFFERENCE

Since we have “Next Year” and “This Year” budget numbers, let’s compare the two. We always want to label our columns, so in D1 type “Difference”.

In D2 we will type the calculation for difference =C2-B2

This illustrates how many dollars the department’s budget increased or decreased.

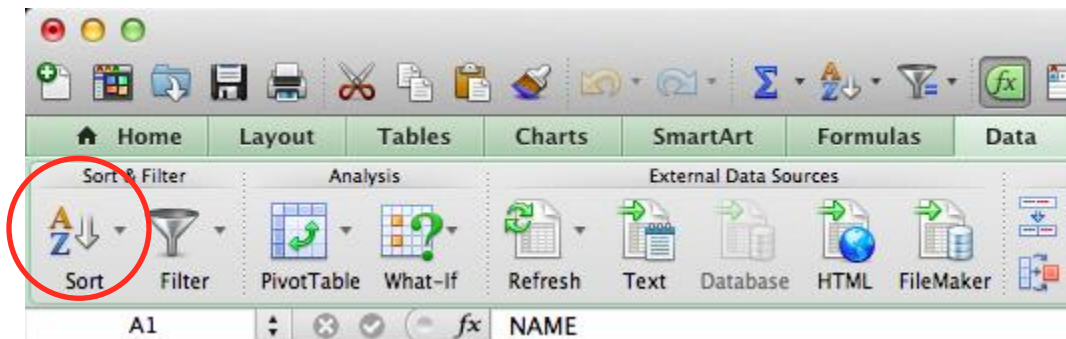
Instead of typing the formula 11 more times, we can copy the formula down. Make sure to click on D2 again and bring the cursor to the small black box in the lower right. Once the black plus sign appears, double-click and it will copy down.

SORTING

If we want to order a column (from highest to lowest or vice versa), we use the sort function. First, we need to highlight the data box we want sorted. Even though you only want to sort the “Difference” column, we highlight the corresponding data as well as a precaution. Note: On older versions of Excel, if you only highlight one column and sort it, the other cells on each row will not move and will stay put. For example, the cells in the “Departments” column would stay in the same order, but the cells in the “Difference” column will be sorted from highest to lowest and now the data are mismatched.

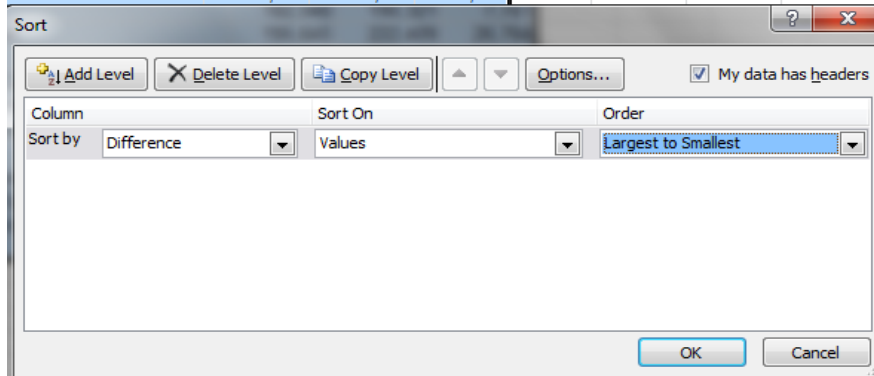
To highlight the data, select the very top left-hand corner of your data and use Shift+Command+→ to select all the way across the top and then Shift+Command+↓ to select down.

Proceed up to the “Data” tab. All the way to the left you’ll see the Sort button. Click on the dropdown next to it and select “Custom sort.”



Excel will then ask what column to sort by — another reason to label your columns. We choose “Difference” from the drop-down menu and “Largest to Smallest” from the “Order” drop-down menu and click OK.

You can sort by more than column by clicking on the “Add Level” button on that “Sort” menu. It will first sort by the column listed at the top.

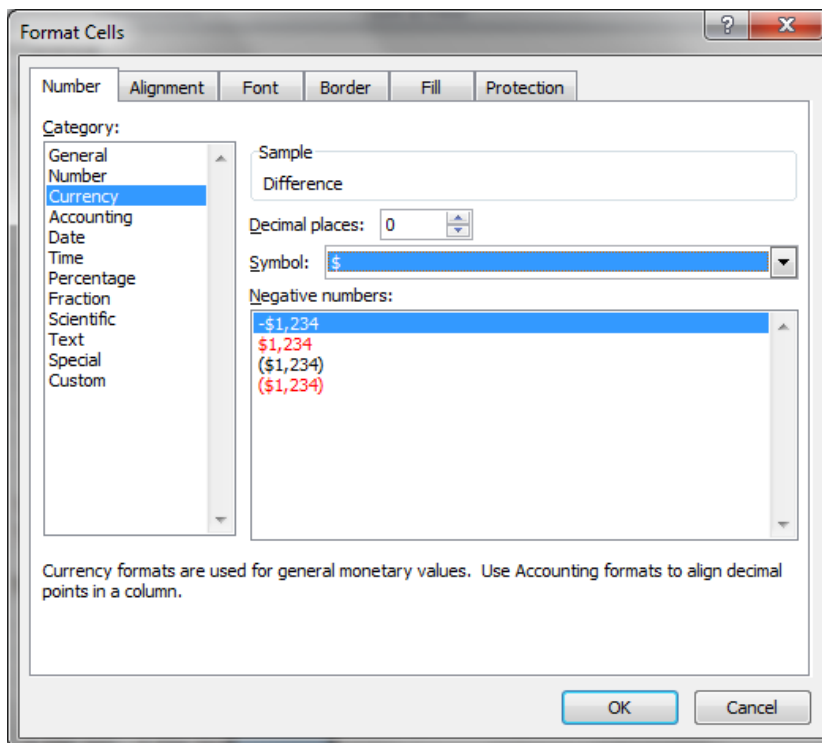


Based on this initial analysis, what could be the story?

FORMATTING

Most find it easier to read the numbers in CityBudget if they are formatted as dollars. To change the “Difference” column, click on the D gray bar, which will highlight the entire column. Then right-click and choose “Format Cells.”

You will want to choose “Currency”. We recommend changing “Decimal places” to 0.



You can also highlight all of the columns and format for currency.

PERCENT CHANGE

The “Difference” will give us the dollar amount, but we don’t know if that amount is a large or small increase or decrease. “Percent change” will put that dollar amount in context and tell us a percentage increase or decrease.

“Percent change” compares two values, typically one year to another. In this case, we want to know how big of increase or decrease each city department saw from this year’s to next year’s budget.

We are comparing the new value versus the old.

$$=(\text{New}-\text{Old})/\text{Old}$$

$$=(\text{N}-\text{O})/\text{O}$$

Did we become journalists to make a lot of money?? NOO!

Did we become journalists because we love math?? NOO!

To remember percent change, we think of a big NOO. How this translates into our spreadsheet:

Label our column “PercentChange” in E1.

In E2 type $=(\text{C2}-\text{B2})/\text{B2}$ and enter. Copy the formula down.

In this spreadsheet we could have just typed $=\text{D2}/\text{B2}$ since we already calculated the difference in Column D.

Remember that in this case the () represent order of operation. We are telling Excel to do the subtraction first, then divide by B2.

	A	B	C	D	E
1	Departments	This year	Next year	Difference	PercentChange
2	Police Department	\$3,101,345	\$3,545,367	\$444,022	14%
3	General City Fund	\$1,234,823	\$1,482,950	\$248,127	20%
4	Health	\$1,033,188	\$1,179,243	\$146,055	14%
5	Fire Department	\$2,456,789	\$2,537,901	\$81,112	3%
6	Municipal Court	\$195,645	\$222,409	\$26,764	14%
7	Planning and Community Development	\$305,607	\$315,640	\$10,033	3%
8	City Manager	\$182,540	\$190,321	\$7,781	4%
9	Community Services	\$85,654	\$90,447	\$4,793	6%
10	City Clerk	\$70,778	\$75,234	\$4,456	6%
11	Personnel	\$191,116	\$195,400	\$4,284	2%
12	City Council	\$105,207	\$95,452	-\$9,755	-9%
13	Public Works	\$2,156,987	\$2,104,866	-\$52,121	-2%
14	Parks and Recreation	\$1,400,400	\$1,235,674	-\$164,726	-12%

PERCENT OF TOTAL

If we think of our total budget as a pie or pizza, we want to know how big of a slice each department is taking of the total budget. “Percent of total” will tell us that.

The formula is the part over the whole.

=part/whole

In this case, the part is each department’s “Next Year” budget total. The whole is the *correct* total located in C17.

In F1, label the PercentTotal column. In F2, type =C2/C17. Copy the formula down. (Bring the cursor to the small black box in the lower right. Once the black plus sign appears, double-click and it will copy down.)

If you followed directions, you should see errors such as, “#DIV/0!” shown below. Let’s select cell F3 and see what the formula bar says (=C3/C18).

What is the problem?

“C18 is blank” With the “#DIV/0!” error, Excel is telling us that we can’t divide by 0.

	B	C	D	E	F
	This year	Next year	Difference	PercentChange	PercentTotal
	\$3,101,345	\$3,545,367	\$444,022	14%	0.267153391
	\$1,234,823	\$1,482,950	\$248,127	20%	#DIV/0!
	\$1,033,188	\$1,179,243	\$146,055	14%	#VALUE!
	\$2,456,789	\$2,537,901	\$81,112	3%	0.95365571
	\$195,645	\$222,409	\$26,764	14%	0.055324081
ent	\$305,607	\$315,640	\$10,033	3%	0.110868359
	\$182,540	\$190,321	\$7,781	4%	0.657140391
	\$85,654	\$90,447	\$4,793	6%	0.257757196
	\$70,778	\$75,234	\$4,456	6%	0.060950742
	\$191,116	\$195,400	\$4,284	2%	1.017708333
	\$105,207	\$95,452	-\$9,755	-9%	0.588360023
	\$2,156,987	\$2,104,866	-\$52,121	-2%	1.590431416
	\$1,400,400	\$1,235,674	-\$164,726	-12%	4.927204868

The problem occurs when we copy down our formula. Excel erroneously believes that for every “part” or “department” we move down, the “whole” or “total” must also move down a row. In order to calculate the “percent of total” for each department, we want the total or “whole” to stay the same while the “department” or “part” changes. For example, F3 should say =C3/C17 not C18.

To copy down the correct formula, we need to “anchor” cell C17 so each department is always divided by the total.

Double-click on F1 and add \$ in front of second C and between the C and 17 like below.

		=C2/\$C\$17	
	E	F	
	PercentChange	PercentTotal	
2	14%	=C2/\$C\$17	
7	20%	#DIV/0!	
5	14%	#VALUE!	
2	3%	0.95365571	

This anchors C17. The \$ is not referencing money. It’s just simply a symbol telling Excel that each department should be divided by C17. After fixing the formula in F2, copy it down.

The results are a little hard to read because they are in decimals. We can change that by formatting our column. Click on the F gray bar at the top, which will highlight the entire column. Then right-click and choose “Format Cells.”

You will want to choose “Percentage.” We recommend changing “Decimal places” to 0. Click “OK.”

CHARTS AND GRAPHS

If we wrote a story full of numbers and statistics, we would lose our audience. Visuals are important to explain our findings to our audience and sometimes our bosses (and save inches of copy or time explaining numbers in a package).

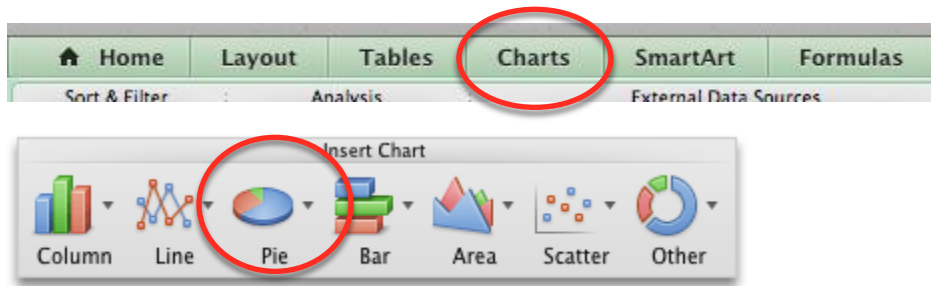
Excel offers several options for charts and graphs. For this exercise, we are going to illustrate our Percent of Total results in a Pie Chart. It will show who is taking up the biggest piece of the pie, i.e. the city’s total budget.

We need to first highlight the columns we want in our pie chart. This is where Excel is fickle, so you might have to repeat the steps.

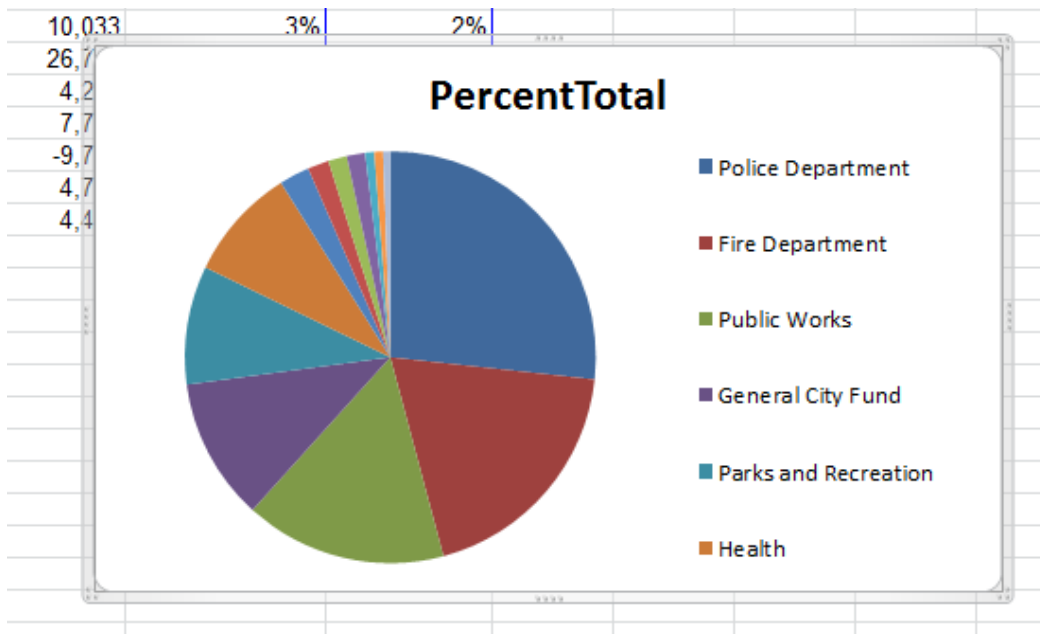
Using our fat white plus sign, left-click and hold on A1 and drag down to highlight all cells A1-A14. Let go of the keys.

Hold down your Command key and while doing so, highlight cells F1-F14 like you did in Column A.

Click on the “Charts” tab. Then you should see all of the available charts in Excel. You can choose any type of pie chart they would like.



If a pie chart does not pop-up like below, you will need to click on the white box, delete and start over highlighting the columns.



There are a few things we can do with our chart to make it more presentable. If you click on the title “PercentTotal,” you can delete those words and type a new title, such as “Budget 2014.”

You can also right-click on the pie and choose “Add data labels.” It will then add the percentages of each slice.

Reporters can use this graphic online or for print. *The New York Times* has published a few Excel charts on their website. If you’d like to save this as an image, you can right-click on the chart and there’s an option called “Save as Picture.” You can choose a file type (jpeg, png, etc) and save it as a separate file.

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