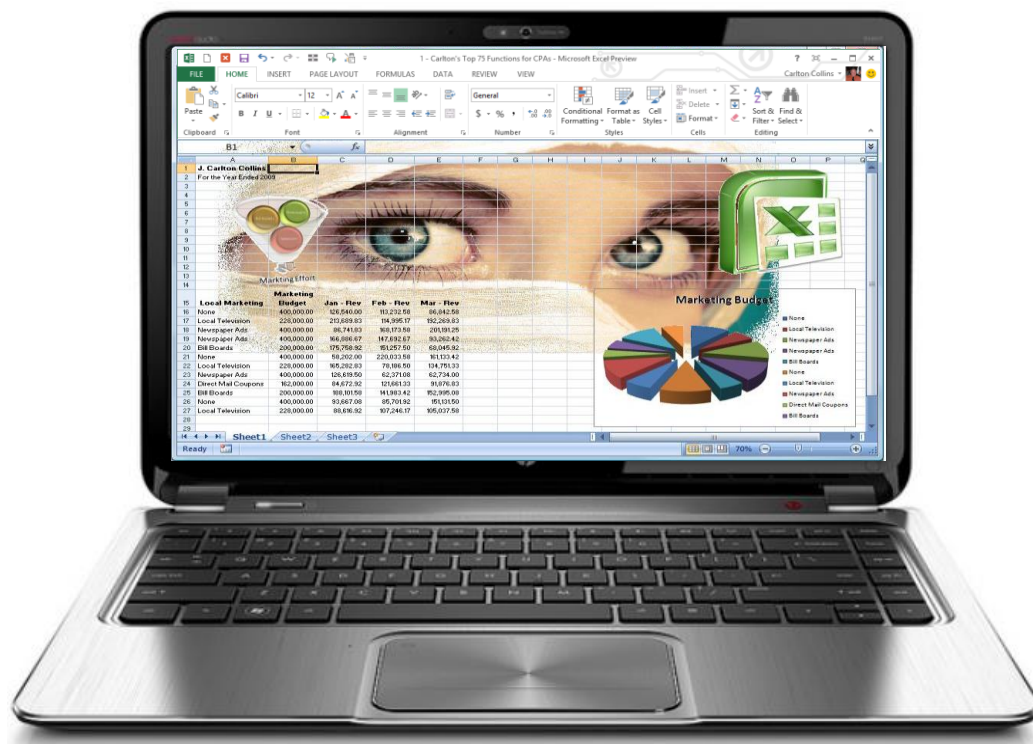


ASA Research

Using Excel to Detect Fraud



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Using Excel to Detect Fraud CPE Course Information

Learning Objectives	To increase the productivity of accountants and CPAs using Excel's commands and functions related to possibly detecting fraud
Course Level	Intermediate
Pre-Requisites	Familiarity with Microsoft Excel
Advanced Preparation	None
Presentation Method	Live lecture using full color projection systems and live Internet access with follow up course materials
Recommended CPE Credit	8 hours
Handouts	Templates, checklists, web examples, manual
Instructors	J. Carlton Collins, CPA



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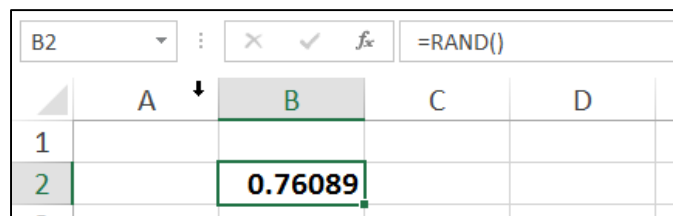


Random Numbers

Excel provides two tools for generating random numbers as follows:

1. **RAND**
2. **RANDBETWEEN** (You must first activate the Analysis ToolPak)

RAND - The RAND function in Microsoft Excel allows you to generate random numbers in Excel. Specifically, type RAND() in a given cell to produce a random number between 0 and 1, as shown.



Comments

1. RAND is a volatile function, which means it will be recalculated any time the enter key is pressed, so the random number constantly changes. To prevent random numbers from changing, most people copy and paste them as values.
2. Excel's **RAND** function can be used to generate random numbers from the Uniform distribution, however, be aware that prior to Excel 2003, this function should not be used with large simulation models because the older versions of Excel use the generation algorithm which has a relatively small period (less than 1 million numbers), so if your model contains hundreds of variables and you are running the simulation tens of thousands of times, you can run out of random numbers. This problem has been fixed in Excel 2003 and later versions.
3. Note that there is a known bug in Excel 2003 causing the RAND function to return negative numbers, which can be negated using the **ABS** (absolute function).

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RANDBETWEEN - In Excel 2010, 2007 and 2003, you must first activate Analysis Tool Pack add-in as follows. In Excel 2010 and 2007, select **File, Options, Add-ins, GO** and place a check in the check box labeled **Data Analysis ToolPak**, then click **OK**. In Excel 2003, select **Tools, Add ins...**

The **RANDBETWEEN** returns a random integer between two specified numbers, as shown.

B2		=RANDBETWEEN(2000,6000)	
	A	B	C
1			
2		2770	
3			

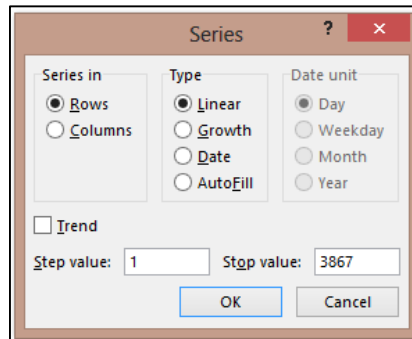
Suppose you wanted to select 100 random numbers from three different ranges of the population. There are several approaches you might take. The first approach might be simply to list all possible values, then use RAND to create a random number adjacent to those values, and then sort. The screen shots below show the data before and after sorting. Once sorted, simply take the desired number of samples from the top of the randomly sorted list, as suggested by the top 7 values shaded in the second screen shot.

	K	L	M
7			
8		Invoices #'s	RAND
9		1000	0.7083
10		1001	0.0191
11		1002	0.0025
12		1003	0.7310
13		1004	0.1678
14		1005	0.8405
15		6050	0.0335
16		6051	0.4653
17		6052	0.7973
18		6053	0.4083
19		6054	0.7150
20		6055	0.8662
21		6056	0.7748
22		12095	0.2045
23		12096	0.1231
24		12097	0.6091
25		12098	0.7585
26		12099	0.2055
27		12100	0.0849

Invoices #'s
12099
1001
6054
6051
6055
1004
6056
1000
12100
1003
6050
6052
12097
12096
1002
1005
12095
12098
6053

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This method takes up a lot of Excel screen real estate, but so what? Excel has millions of rows and the generation of such a report is fairly straight forward and fast. Just use the **FILL** command to fill in the necessary ranges, then add **RAND** and sort – it might take you 2 to 3 minutes.



Random Numbers Given Three Ranges of Population Data

Another way to generate random numbers is to use **RANDBETWEEN**, and assigning the probability that a random number is selected from a given range based upon the percentage that range represents compared to the total population. For example, consider the following example:

Random Numbers Given Three Ranges of Population Data							Random Number Between 1% and 100%	Random Number	
		1st Range	2nd Range	3rd Range			1	49%	7731
	Low Number	3,333	6,500	12,000			2	85%	6507
	High Number	4,444	7,777	12,055			3	2%	6792
							4	53%	7617
	Difference	1,111	1,277	55	2443		5	27%	7304
	Percentage Diff	45%	52%	2%			6	34%	7461
							7	45%	7107
							8	40%	7238
							9	85%	7455
							10	48%	6619
							11	63%	7476
							12	28%	6656
							13	2%	7016
							14	85%	6741
							15	31%	6675
							16	46%	6835
							17	46%	7114
							18	32%	7098
							19	39%	7545
							20	35%	7442

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Cells C4 through E5 contain the low and high values for three separate ranges of data making up the total population. We start by calculating the number of occurrences in each range (1,111, 1,277 and 55 in this example), and then calculate the percentage each range represents for the total population (45%, 52% and 2% in this example).

Thereafter, a series of **RANDBETWEEN** functions are used to produce random number triggers between 1% and 100% (contained in cells **I3** through **I22** in this example), and then an **IF** function is used to calculate within which range each random number trigger falls. For example, the first random number trigger is 49% (in cell **I3**), which falls within the second range data. The **RANDBETWEEN** function in cell **J3** thusly calculates a random number using the second range of data's low and high values (6,500 and 7,777 in this example), and the first random number generated is 7,731 in this example.

This method could theoretically be used to calculate random numbers for many separate ranges of data, with each member of the population having an equal chance to be selected.

Download this workbook at www.CarltonCollins.com/5random.xlsx.

Consolidating Data in Excel

Consolidating data is a common task for CPAs, and Excel offers a variety of methods for performing this task. The particular method you use will probably depend on the layout of your data, and you may need to clean, edit or manipulate your data a bit to prepare it for consolidation. CPAs often have a need to consolidate data such as budgets, months, departments, locations, warehouses and sale representatives.

Following I will explain four different consolidation methods - two methods for consolidating data with similar layouts, and two more methods for consolidating data with dis-similar layouts. These four methods are as follows:

- A. Simple formulas.
- B. Spearing formulas.
- C. The “Data Consolidate Command”.
- D. The “PivotTable Wizard”.

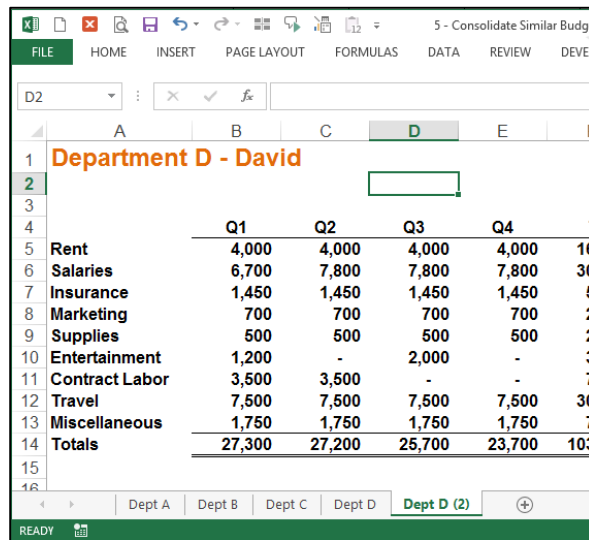
A. Using Simple Formulas To Consolidate Similar Data

The workbook below contains budgets with identical layouts for Departments A, B, C and D. The goal is to consolidate these four budgets into a single consolidated budget.

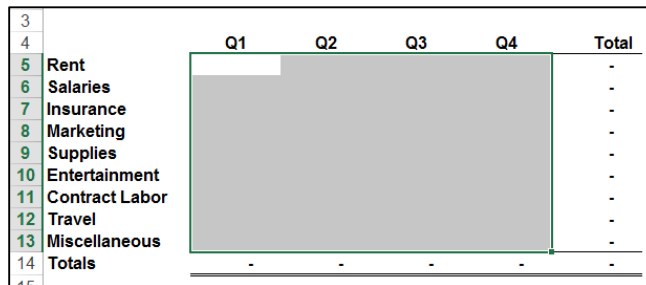
	Q1	Q2	Q3	Q4	Total
Department A - George					
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	27,300	27,200	25,700	23,700	103,900

1. Insert a New Worksheet on which the consolidation will appear

- i. **Don't click the New Sheet or Add Sheet Option** - Because there is a better and quicker approach.
- ii. **CTRL + Drag Tab** – To insert a new worksheet, select worksheet labeled “Dept D”; then use the CTRL + Drag Tab keystroke combination to create a duplicate worksheet of Dept D. The advantage is that the data, column widths, page footers and headers, and margin settings are all duplicated automatically, so you don't have to create a new page from scratch.

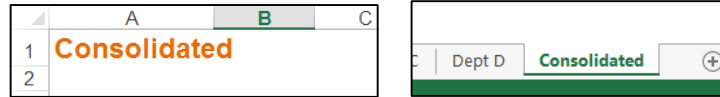


- iii. (The menu method for achieving this same procedure is to right click on the tab and select Move or Copy, but **CTRL + Drag Tab** is quicker.)
- iv. **Clean the Page** – Clean the new worksheet by deleting the data in the grid area, so that new formulas can be inserted.



- v. **Re-label** – Change the worksheet label in Cell A1 and on the Worksheet Tab to read “consolidated”.

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- 2. Formula** – In cell B5, enter a formula adding the B5 cells in the four budget sheets. The formula should look like this:

= 'Dept A'!B5+'Dept B'!B5+'Dept C'!B5+'Dept D'!B5

- 3. Copy** – Copy the formula down and across to complete the consolidation, and you are done.

	Q1	Q2	Q3	Q4	Total
Rent	14,500	14,500	14,500	14,500	58,000
Salaries	24,600	24,800	24,800	24,800	99,000
Insurance	4,130	3,600	3,600	3,600	14,930
Marketing	2,700	2,700	2,700	2,700	10,800
Supplies	1,460	1,460	1,460	1,460	5,840
Entertainment	3,205	1,660	4,830	1,800	11,495
Contract Labor	9,050	9,050	2,050	2,050	22,200
Travel	24,500	24,500	24,500	24,500	98,000
Miscellaneous	5,350	5,350	5,350	5,350	21,400
Totals	89,495	87,620	83,790	80,760	341,665

B. Using Spearing Formulas To Consolidate Similar Data

The workbook below contains budgets with identical layouts for Departments A, B, C and D. The goal is to consolidate these four budgets into a single consolidated budget.

	Q1	Q2	Q3	Q4	Total
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	27,300	27,200	25,700	23,700	103,900

1. Insert a New Worksheet on which the consolidation will appear

- i. **Don't click the New Sheet or Add Sheet Option** - Because there is a better and quicker approach.
- ii. **CTRL + Drag Tab** – To insert a new worksheet, select worksheet labeled “Dept D”; then use the CTRL + Drag Tab keystroke combination to create a duplicate worksheet of Dept D. The advantage is that the data, column widths, page footers and headers, and margin settings are all duplicated automatically, so you don't have to create a new page from scratch.

	Q1	Q2	Q3	Q4	Total
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	27,300	27,200	25,700	23,700	103,900

- iii. (The menu method for achieving this same procedure is to right click on the tab and select Move or Copy, but **CTRL + Drag Tab** is quicker.)
- iv. **Clean the Page** – Clean the new worksheet by deleting the data in the grid area, so that new formulas can be inserted.

	Q1	Q2	Q3	Q4	Total
Rent					-
Salaries					-
Insurance					-
Marketing					-
Supplies					-
Entertainment					-
Contract Labor					-
Travel					-
Miscellaneous					-
Totals	-	-	-	-	-

- v. **Re-label** – Change the worksheet label in Cell A1 and on the Worksheet Tab to read “consolidated”.

	A	B	C
1	Consolidated		
2			

	Dept D	Consolidated	
1			
2			

- 2. **Formula** – In cell B5, enter a formula adding the B5 cells in the four budget sheets. The formula should look like this:

=SUM('Dept A:Dept D'!C5)

I use the mouse to accomplish this step. Start by typing “=SUM(“, then click on cell B5 in Dept A, hold the shift key down, and click cell B5 in Dept D.

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3. **Copy** – Copy the formula down and across to complete the consolidation, and you are done.

The screenshot shows an Excel spreadsheet with a consolidated financial table. The formula bar at the top displays the formula `=SUM('Dept A:Dept D'!B5)`. The table is structured as follows:

	Q1	Q2	Q3	Q4	Total
Rent	14,500	14,500	14,500	14,500	58,000
Salaries	24,600	24,800	24,800	24,800	99,000
Insurance	4,130	3,600	3,600	3,600	14,930
Marketing	2,700	2,700	2,700	2,700	10,800
Supplies	1,460	1,460	1,460	1,460	5,840
Entertainment	3,205	1,660	4,830	1,800	11,495
Contract Labor	9,050	9,050	2,050	2,050	22,200
Travel	24,500	24,500	24,500	24,500	98,000
Miscellaneous	5,350	5,350	5,350	5,350	21,400
Totals	89,495	87,620	83,790	80,760	341,665

The status bar at the bottom of the spreadsheet shows the following statistics: AVERAGE: 9,491, COUNT: 36, SUM: 341,665.

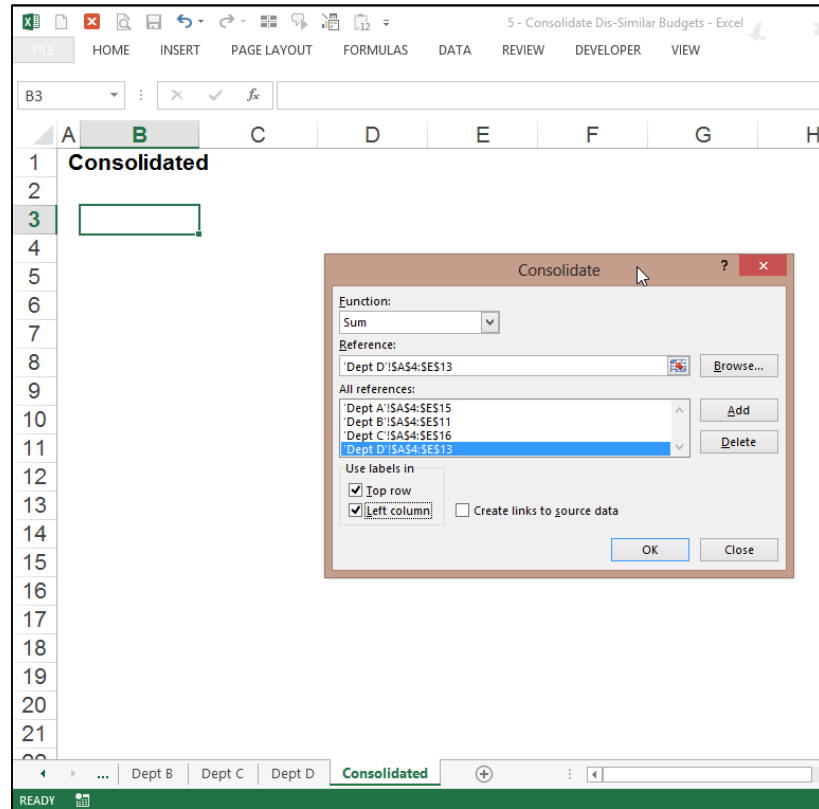
C. Using the “Data Consolidate Command” To Consolidate Dissimilar Similar Data

The workbook below contains dis-similar budgets for Departments A, B, C and D. Specifically, the four worksheets contain budgets for separate departments, and some budgets contain more rows and different row descriptions than others. The goal is to consolidate these four departmental budgets using the **Consolidate** Command.

	Q1	Q2	Q3	Q4	Total
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Fringe Benefits	1,005	1,170	1,170	1,170	4,515
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Advertising	1,350	2,350	3,000	55	6,755
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	29,655	30,720	29,870	24,925	115,170

1. **Create A New Worksheet** – Insert a new worksheet. Because there is no need to duplicate a template from another worksheet you might be tempted to use the New Sheet button this time; however, this approach does not duplicate the worksheet’s page footers, headers or margin settings. Therefore I would still recommend that you use the CTRL + Drag Tab method as described in examples 1 & 2 above to create a new sheet, and I would then eliminate the data on the new sheet by deleting those columns that contain data.
2. **Label** – As before, label the new worksheet in Cell A1 and on the Worksheet Tab to read “Consolidated”.
3. **Select Cell** – Select a blank cell on the new worksheet such as B3.
4. **Use the Consolidate Command** - From the **Data** tab, select **Consolidate** to display the Consolidate dialog box as pictured below. Click the **Cell Chooser** button, then highlight the data only on **Dept A**, click **Enter**, and then click **Add**. Repeat this process for **Dept B**, **Dept C** and **Dept D**.

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5. Check the check boxes to use Labels in the **Top Row** and **Left Column**.
6. **Finish** – Click **OK** to produce the results.

	A	B	C	D	E	F	G
1		Consolidated					
2							
3			Q1	Q2	Q3	Q4	
4		Rent	14,500	14,500	14,500	14,500	
5		Salaries	24,600	24,800	24,800	24,800	
6		Fringe Benefits	1,005	1,170	1,170	1,170	
7		Insurance	2,680	2,150	2,150	2,150	
8		Marketing	1,000	1,000	1,000	1,000	
9		Advertising	1,350	2,350	3,000	55	
10		Supplies	1,460	1,460	1,460	1,460	
11		Equipment	3,240	1,230	679	4,500	
12		Client Gifts	500	500	500	500	
13		Cell Phones	1,250	1,250	1,250	1,250	
14		Entertainment	3,205	1,660	4,830	1,800	
15		Contract Labor	7,050	7,050	50	50	
16		Travel	24,500	24,500	24,500	24,500	
17		Air Fare	4,000	4,000	5,000	2,300	
18		Hotels	2,300	1,450	3,000	2,030	
19		Miscellaneous	5,350	5,350	5,350	5,350	
20							
21							

7. **Add Totals and Formatting** - Highlight your data and expand the selection to include a blank bottom row and blank right column. Click the **AutoSum** tool, add formatting and you are done.

	A	B	C	D	E	F	G
1		Consolidated					
2							
3			Q1	Q2	Q3	Q4	Totals
4		Rent	14,500	14,500	14,500	14,500	58,000
5		Salaries	24,600	24,800	24,800	24,800	99,000
6		Fringe Benefits	1,005	1,170	1,170	1,170	4,515
7		Insurance	2,680	2,150	2,150	2,150	9,130
8		Marketing	1,000	1,000	1,000	1,000	4,000
9		Advertising	1,350	2,350	3,000	55	6,755
10		Supplies	1,460	1,460	1,460	1,460	5,840
11		Equipment	3,240	1,230	679	4,500	9,649
12		Client Gifts	500	500	500	500	2,000
13		Cell Phones	1,250	1,250	1,250	1,250	5,000
14		Entertainment	3,205	1,660	4,830	1,800	11,495
15		Contract Labor	7,050	7,050	50	50	14,200
16		Travel	24,500	24,500	24,500	24,500	98,000
17		Air Fare	4,000	4,000	5,000	2,300	15,300
18		Hotels	2,300	1,450	3,000	2,030	8,780
19		Miscellaneous	5,350	5,350	5,350	5,350	21,400
20		Totals	97,990	94,420	93,239	87,415	373,064
21							

Comments:

- **Row Descriptions** - Note that the consolidation works only to the extent that the different worksheets contain the same row descriptions. If your four department heads had used the descriptions: **Rent**, **Rent Exp.**, **Rent Expense**, and **Rental Expense**, then those rows would not actually be consolidated, rather they would be shown as four separate rows in the resulting consolidation. However, because all four department heads did use the phrase **Rent** to describe that row, the four respective rent rows were properly consolidated.
- **Account Numbers** – As an option, you might insert account numbers to the left of the row descriptions to consolidate dissimilar information which contains dis-similar row descriptions.
- **To Update** – To update the results, place your cursor in the upper left hand corner of the Consolidation range, and rerun the **Consolidate** command. If the resulting report is a different size, you may need to clean up your data and reapply totals.

- **Consolidate Different Workbooks** – Excel can also consolidate data from different workbooks. The procedure is exactly the same except that you use the **Browse** button instead of the **Cell Chooser** button to point to your data ranges.

The Problem with Data Consolidate

The problem with Data Consolidate occurs when you attempt to change the source data, for example when you insert a new row in Dept A; a comedy of errors ensues as follows:

1. When you change the source data, the consolidated report does not update automatically.
2. Pressing the Refresh button does nothing.
3. To update the consolidated report, you must rerun the data consolidate command. But upon re-running this command, you find that your cursor needs to be in the exact same location when you ran it last time.
4. You also find that you need to erase the previous data before re-running the Data Consolidate command.
5. Next you find that in Excel 2003, 2007 and 2010, you need to re-adjust your consolidating range for Dept A because the tool did not automatically expand the selection when the row was inserted in Dept A. (This issue has been corrected in Excel 2013.)

Because source data tends to change frequently, you are probably better off using the next method to consolidate your data - the **PivotTable and Chart Wizard** method.

D. Using A PivotTable To Consolidate Dissimilar Similar Data

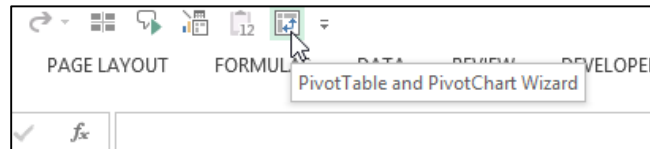
The workbook below contains the same dis-similar budget data used in example 3 above. The four worksheets contain budgets for separate departments, and some budgets contain more rows and different row descriptions than others. The goal is to consolidate these four departmental budgets using the PivotTable approach.

	Q1	Q2	Q3	Q4	Total
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Fringe Benefits	1,005	1,170	1,170	1,170	4,515
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Advertising	1,350	2,350	3,000	55	6,755
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	29,655	30,720	29,870	24,925	115,170

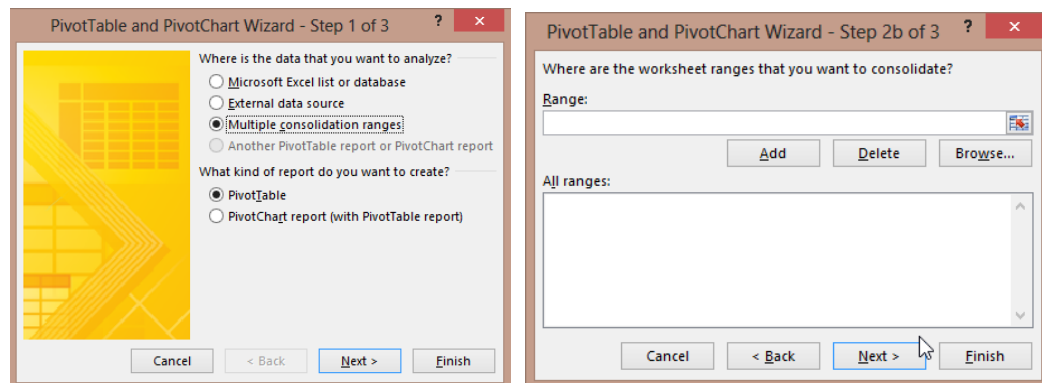
1. **Create A New Worksheet** – Start by inserting a new worksheet. (Because there is no need to duplicate a template from another worksheet you might be tempted to use the New Sheet button this time; however, this approach does not duplicate the worksheet’s page footers, headers or margin settings. Therefore I would still recommend that you use the CTRL + Drag Tab method as described in examples 1 & 2 above to create a new sheet, and I would then eliminate the data on the new sheet by deleting those columns that contain data.)
2. **Label** – Label the new worksheet in Cell A1 and on the Worksheet Tab to read **Consolidated**.
3. **Select Cell** – Select a blank cell such as B3.
4. **Add the PivotTable Wizard to Your Quick Access Toolbar** – The PivotTable Wizard in Excel 2003 allows you to pivot multiple consolidation ranges, but for unknown reason this tool is hidden in later versions of excel. Therefore, in Excel 2013, 2010 and 2007, you must first customize your Quick Access toolbar and insert the icon titled **PivotTable and PivotChart Wizard** as shown below.

Using Excel to Detect Fraud

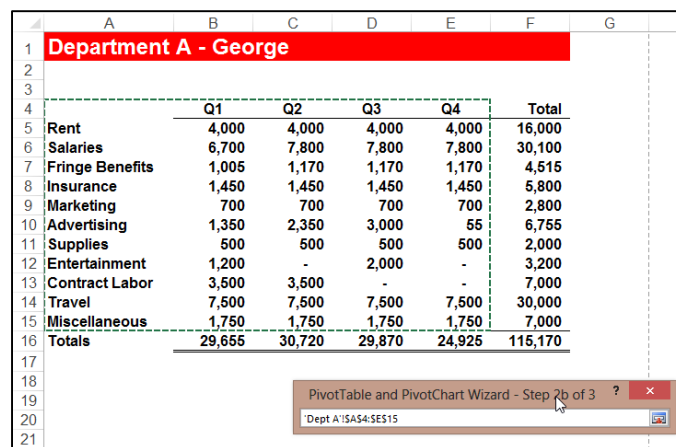
To add this tool, right-click your **Quick-Access** toolbar, select **Customize Quick Access Toolbar**, select the option to **View All Commands**, locate the **PivotTable and PivotChart Wizard** icon and add it to your toolbar. The resulting toolbar will appear as follows. .



5. **Run the PivotTable Wizard** – Click the **PivotTable and PivotChart Wizard** icon to display the PivotTable and PivotChart Wizard dialog box as shown below. Choose the **Multiple consolidation ranges** option and click Next, and Next again. The dialog box on the right should now be displayed.

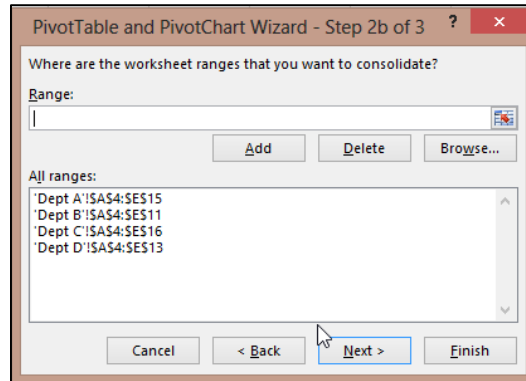


Click the Cell Chooser button, then highlight the **data only** on Dept A, click “Enter”, and then click “Add”.

A screenshot of an Excel spreadsheet. The spreadsheet has a header row 'Department A - George' in red. Below it is a table with columns for Q1, Q2, Q3, Q4, and Total. The rows list various expenses: Rent, Salaries, Fringe Benefits, Insurance, Marketing, Advertising, Supplies, Entertainment, Contract Labor, Travel, and Miscellaneous. A PivotTable Wizard dialog box is open in the bottom right corner, showing the range 'Dept A!\$A\$4:\$E\$15' selected in the 'Range' field.

	Q1	Q2	Q3	Q4	Total
Rent	4,000	4,000	4,000	4,000	16,000
Salaries	6,700	7,800	7,800	7,800	30,100
Fringe Benefits	1,005	1,170	1,170	1,170	4,515
Insurance	1,450	1,450	1,450	1,450	5,800
Marketing	700	700	700	700	2,800
Advertising	1,350	2,350	3,000	55	6,755
Supplies	500	500	500	500	2,000
Entertainment	1,200	-	2,000	-	3,200
Contract Labor	3,500	3,500	-	-	7,000
Travel	7,500	7,500	7,500	7,500	30,000
Miscellaneous	1,750	1,750	1,750	1,750	7,000
Totals	29,655	30,720	29,870	24,925	115,170

Repeat this process for Dept B, C and D until the PivotTable Wizard appears as follows.



6. **Finish** – Click “FINISH” to produce the results.

	A	B	C	D	E	F	G
1		Page1	(All)				
2							
3		Sum of Value	Column Labels				
4		Row Labels	Q1	Q2	Q3	Q4	Grand Total
5		Advertising	1350	2350	3000	55	6755
6		Air Fare	4000	4000	5000	2300	15300
7		Cell Phones	1250	1250	1250	1250	5000
8		Client Gifts	500	500	500	500	2000
9		Contract Labor	7050	7050	50	50	14200
10		Entertainment	3205	1660	4830	1800	11495
11		Equipment	3240	1230	679	4500	9649
12		Fringe Benefits	1005	1170	1170	1170	4515
13		Hotels	2300	1450	3000	2030	8780
14		Insurance	2680	2150	2150	2150	9130
15		Marketing	1000	1000	1000	1000	4000
16		Miscellaneous	5350	5350	5350	5350	21400
17		Rent	14500	14500	14500	14500	58000
18		Salaries	24600	24800	24800	24800	99000
19		Supplies	1460	1460	1460	1460	5840
20		Travel	24500	24500	24500	24500	98000
21		Grand Total	97990	94420	93239	87415	373064
22							

7. **Add Formatting** - Highlight your data and add comma formatting with no decimals, adjust the columns widths to taste, center the column headings; then you are done.

	A	B	C	D	E	F	G
1		Page1	(All)				
2							
3		Sum of Value	Column Labels				
4		Row Labels	Q1	Q2	Q3	Q4	Grand Total
5		Advertising	1,350	2,350	3,000	55	6,755
6		Air Fare	4,000	4,000	5,000	2,300	15,300
7		Cell Phones	1,250	1,250	1,250	1,250	5,000
8		Client Gifts	500	500	500	500	2,000
9		Contract Labor	7,050	7,050	50	50	14,200
10		Entertainment	3,205	1,660	4,830	1,800	11,495
11		Equipment	3,240	1,230	679	4,500	9,649
12		Fringe Benefits	1,005	1,170	1,170	1,170	4,515
13		Hotels	2,300	1,450	3,000	2,030	8,780
14		Insurance	2,680	2,150	2,150	2,150	9,130
15		Marketing	1,000	1,000	1,000	1,000	4,000
16		Miscellaneous	5,350	5,350	5,350	5,350	21,400
17		Rent	14,500	14,500	14,500	14,500	58,000
18		Salaries	24,600	24,800	24,800	24,800	99,000
19		Supplies	1,460	1,460	1,460	1,460	5,840
20		Travel	24,500	24,500	24,500	24,500	98,000
21		Grand Total	97,990	94,420	93,239	87,415	373,064
22							

Comments:

The **PivotTable Wizard** approach is superior to the **Data Consolidate** approach for many reasons as follows:

1. Totals are automatic inserted with the PivotTable method.
2. Total column and row labels are automatically inserted with the PivotTable method.
3. AutoFilter buttons are automatic inserted with the PivotTable method.
4. If the source data changes, such as inserting a new row in Dept A, simply click refresh to update.
5. The resulting PivotTable is drillable.
6. The resulting PivotTable can be pivoted.
7. The PivotTable report offers many PivotTable tools such as PivotTable formatting which Data Consolidate does not offer.

Download these Consolidation example templates at:

www.CarltonCollins.com/consolidatesimilarbudgets.xlsx

www.CarltonCollins.com/consolidatedissimilarbudgets.xlsx

Benford's Law

Benford's Law predicts the occurrence of digits in large sets of data. Simply put, this law maintains that we can expect some digits to occur more often than others. For example, the numeral 1 should occur as the first digit in any multiple-digit number about 30.1% of the time, while the numeral 9 should occur as the first digit only 4.6% of the time. We also can apply the law to determine the expected occurrence of the second digit of a number, the first two digits of a number and other combinations.

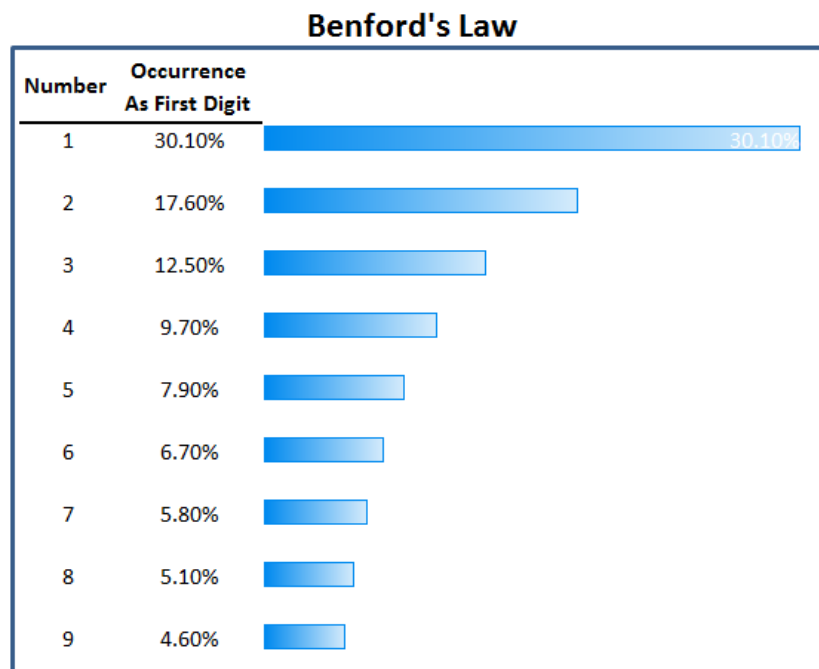
How can such predictions help you red-flag potential irregularities? When someone creates false transactions or commits a data-entry error, the resulting numbers often deviate from the law's expectations. This is true when someone creates random numbers or intentionally keeps certain transactions below required authorization levels.

For example, in 2008, Bernie Madoff famously created fictitious data to hide an estimated \$65 billion in losses resulting from Madoff's investment Ponzi scheme. – Had the CPAs looked at this data using Benford's Law, they might have found that the digits smelled of fraud, perhaps triggering a deeper investigation.



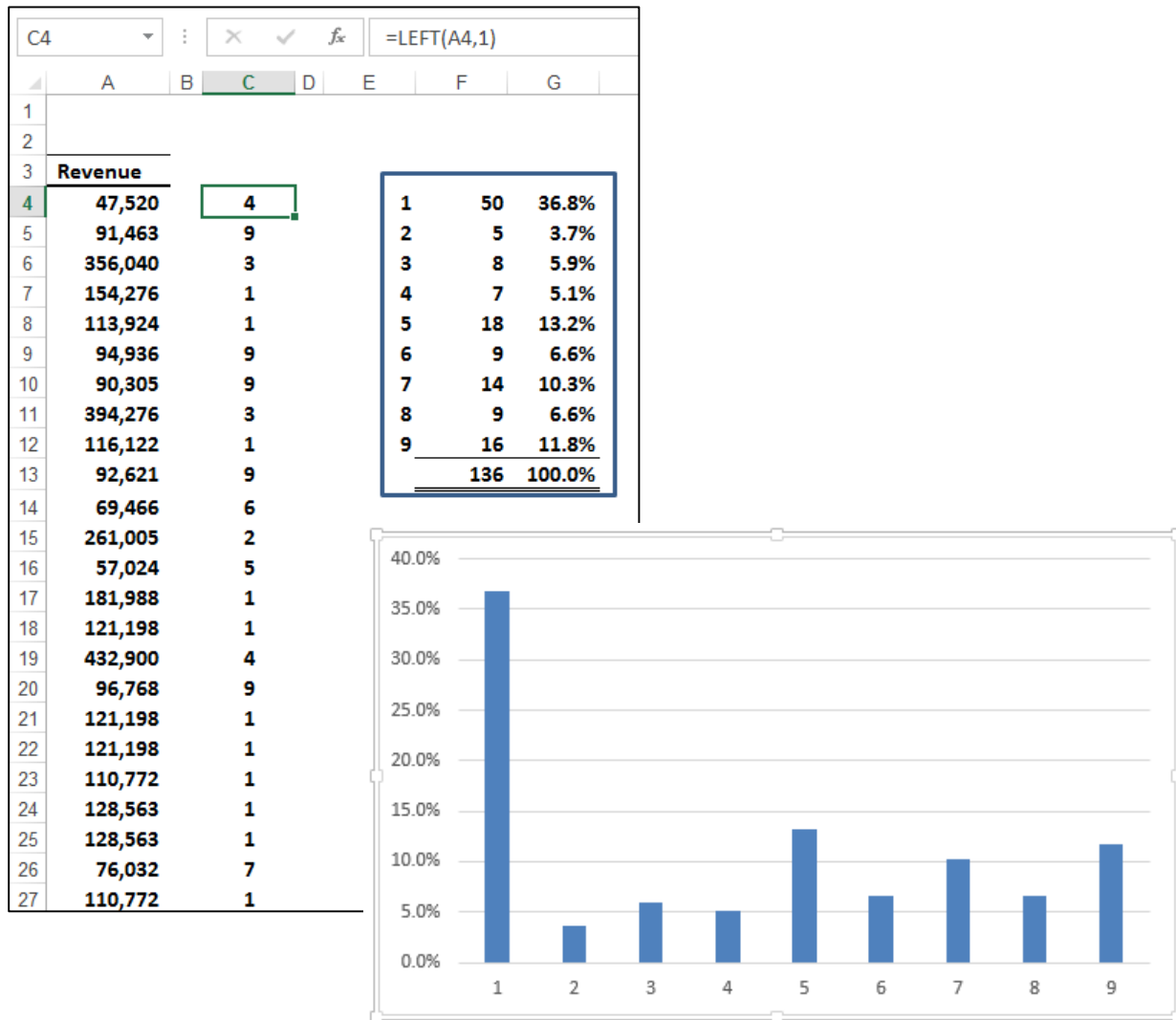
Applying Benford's Law Using Excel

According to Benford's Law, the various digits should occur as the first digit position according to the following percentages.



Using Excel to Detect Fraud

To analyze data, simply use the LEFT function to extract the leading digits, and then add them up as follows. As a simple example, I found a random workbook containing 136 rows of revenue amounts. I entered a formula in cell C4 to extract the first digit and copied this formula down. Next I used the COUNTIF function to count the number of occurrences of each of the nine digits, and calculated their rate of occurrence, then charted the results.



You can clearly see that this data pattern does not conform to Benford's law, and yes, I fabricated this particular set of data years ago.

When Excel helps you spot a deviation like this, it raises a red flag. Considerable statistical research supports the effectiveness of Benford's Law, making it a valuable tool for CPAs. The technique isn't guaranteed to detect fraud in all situations but is useful in analyzing the credibility of accounting records.

A Note of Caution

Benford's Law is not effective for all financial data. If the data set is small, the law becomes less accurate because there are not enough items in the sample and so the rules of randomness don't apply—or at least apply with less predictability.

Also, if the data include built-in minimums and maximums, they also might not conform well to the law's predictions. For example, consider a petty-cash fund where all disbursements are between a \$10 minimum and a \$20 maximum. All first digits would be either 1 or 2, and the expected distribution of first digits would not apply. Likewise, when a company's major product sells for, say, \$9.95, most sales totals will be a multiple of 995, again offsetting the value of the process. Finally, when a data set consists of assigned numbers, such as a series of internally generated invoice numbers, the data will not follow a Benford distribution.

History of Benford's Law

Newcomb, 1881 - The discovery of Benford's law dates back to 1881, when the American astronomer Simon Newcomb noticed that in logarithm tables (used at that time to perform calculations) the earlier pages (which contained numbers that started with 1) were much more worn than the other pages. Newcomb's published result is the first known instance of this observation and includes a distribution on the second digit, as well. Newcomb proposed a law that the probability of a single number N being the first digit of a number was equal to $\log(N + 1) - \log(N)$.

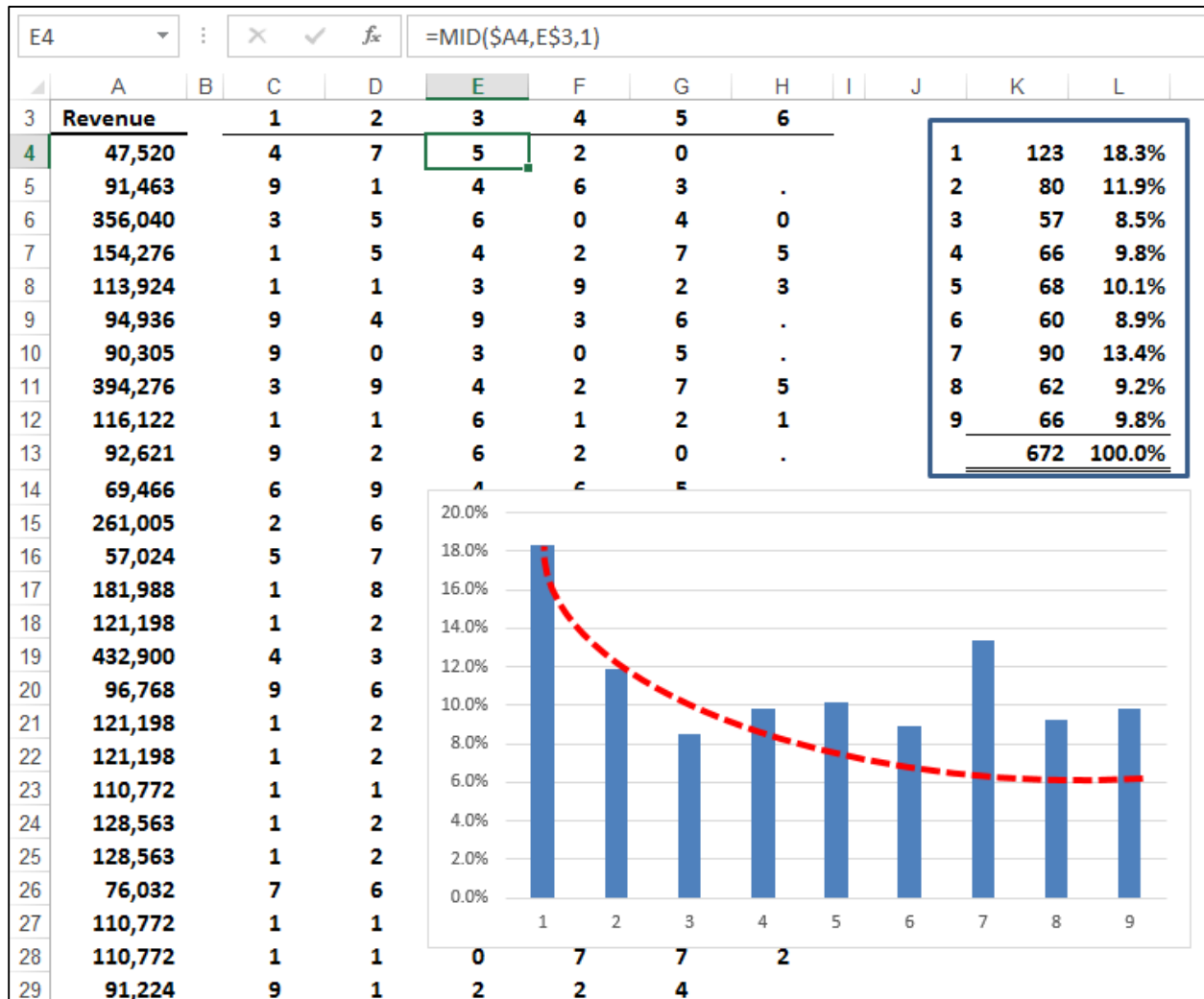
Benford, 1938 - The phenomenon was again noted in 1938 by the physicist Frank Benford, who tested it on data from 20 different domains and was credited for it. His data set included the surface areas of 335 rivers, the sizes of 3259 US populations, 104 physical constants, 1800 molecular weights, 5000 entries from a mathematical handbook, 308 numbers contained in an issue of Readers' Digest, the street addresses of the first 342 persons listed in American Men of Science and 418 death rates. The total number of observations used in the paper was 20,229. This discovery was later named after Benford.

Varian, 1972 - In 1972, Hal Varian suggested that the law could be used to detect possible fraud in lists of socio-economic data submitted in support of public planning decisions. Based on the plausible assumption that people who make up figures tend to distribute their digits fairly uniformly, a simple comparison of first-digit frequency distribution from the data with the expected distribution according to Benford's law ought to show up any anomalous results.

Nigrini, 1999 - Following this idea, Mark Nigrini showed that Benford's law could be used in forensic accounting and auditing as an indicator of accounting and expenses fraud. In practice, applications of Benford's law for fraud detection routinely use more than the first digit.

Analyzing All Digits

Building on the simple example described above, we can expand our Excel formulas to analyze all of the digits included in a set of data as follows: In the example shown below, I have used the MID function to extract each digit from the column of values in column **A**, and the resulting individual numerals are displayed in columns **C** through **H**. Next, I totaled the occurrence for each number 1 through 9 in the summary box and charted the results.

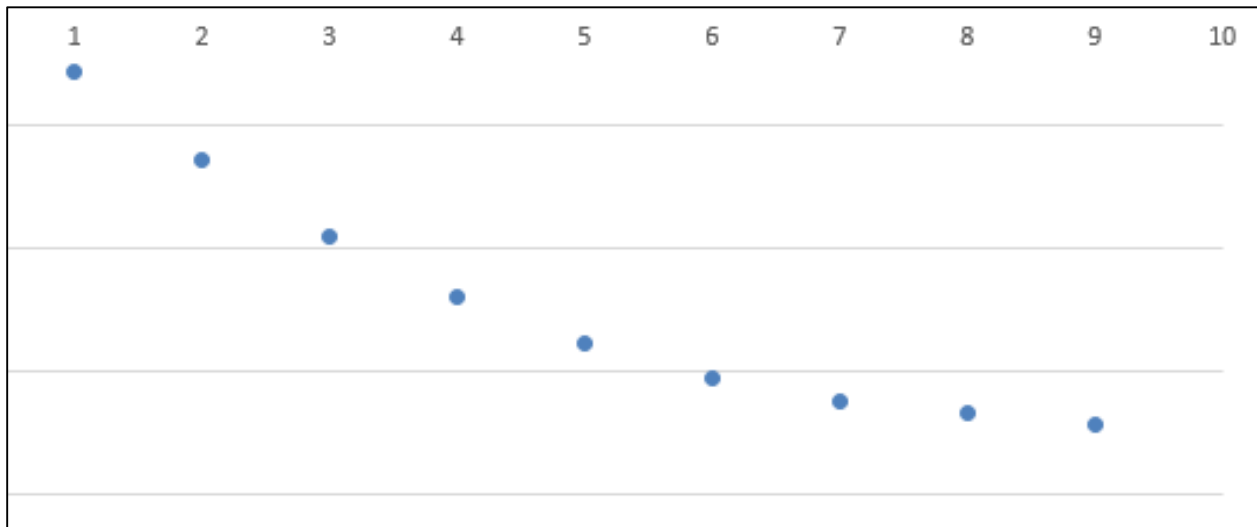


In this example, the data does appear to ever so slightly adhere to Benford's Law as the first 4 bars in the chart and a few others seem to come close to matching Benford's declining curve.

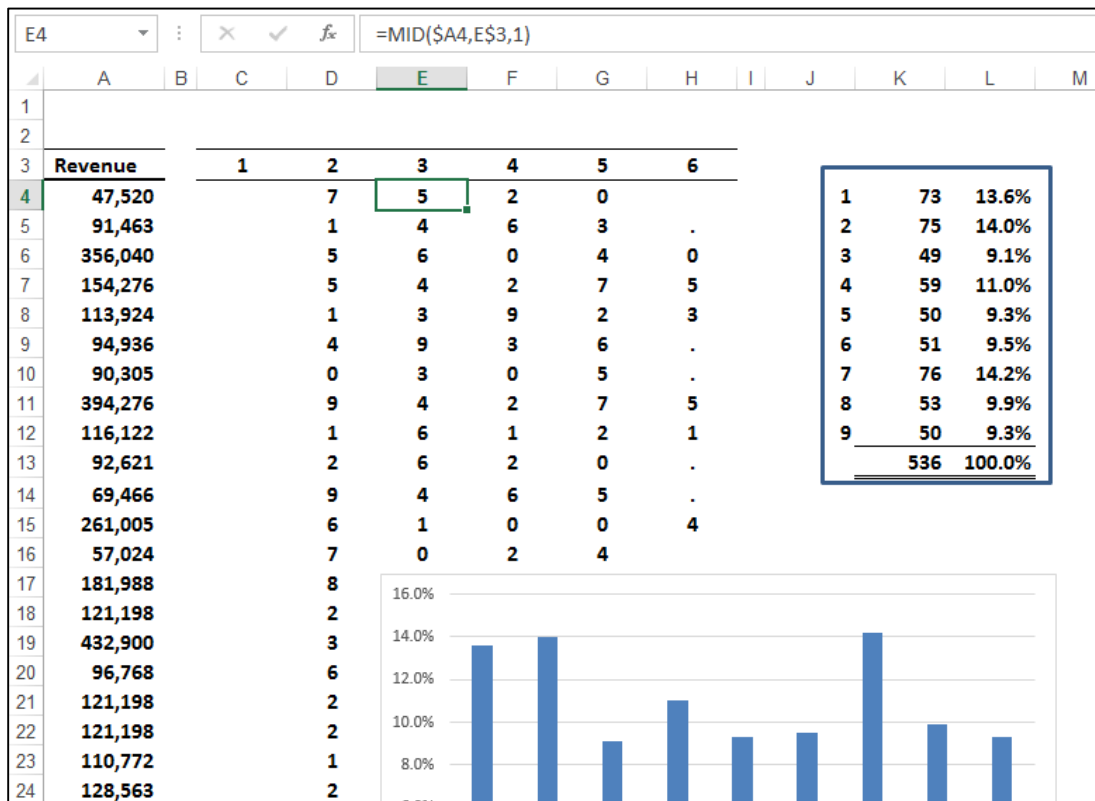
According to Benford's Law one would expect lower numerals to appear more frequently than higher values, but why? Lower digits (1, 2, & 3) tend to appear more frequently than higher digits (7, 8, & 9) because it is easier to own 1 acre than 9 acres; and more people have \$100 than \$900. Lower numbers are typically more achievable than higher numbers in many situations. For this

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reason, we would expect to see an analysis of numbers form a slightly curved declining chart like this one:

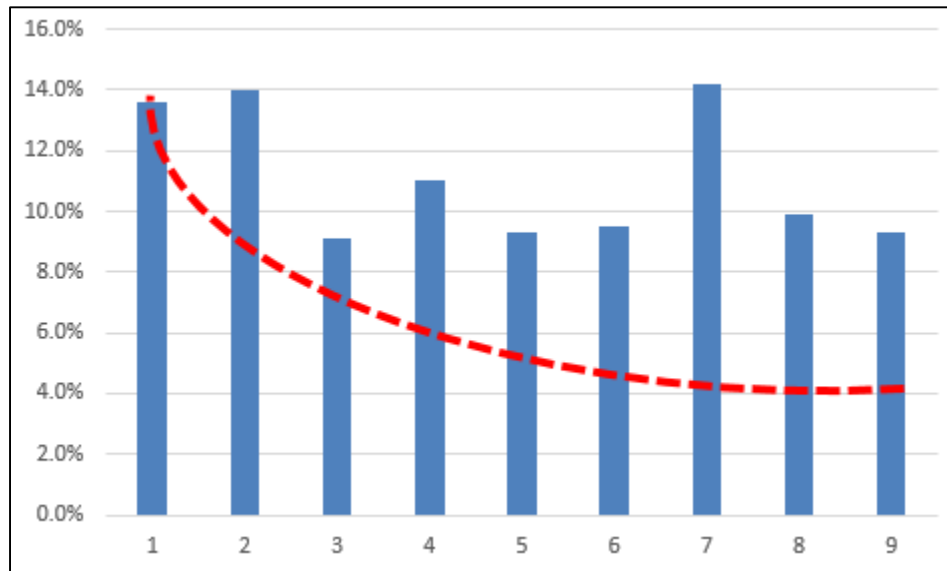


However, the presence of the leading digit may significantly skew the data, therefore, we could ignore the leading digit and analyze the occurrence of the remaining 8 numerals in an effort to determine whether or not the data appears to roughly follow Benford's Law. Ignoring the leading digit reveals the following analysis.



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As expected, the numeral 1 occurs less often than when the leading digits were included. Still, with the leading digit ignored, the data appears not to follow Benford's Law.



Conclusion

This case study was intentionally brief and is only intended to convey the general ideas related to Benford's law. The forensic CPA may choose to run these numbers to help confirm suspicions or beliefs related to the authenticity of a large data set of numbers in question. There are probably many instances where this approach would offer little value, however in a high ticket audit with high potential for fraud, running Benford's Law analysis is a rather quick exercise which may offer insights to help the forensic CPA determine how to best proceed.

Using Regression to Create Budgets & Using Budgets to Detect and Prevent Fraud

Excel provides the ability to extrapolate data from your accounting system to produce budgets, projections or forecasts using the least squares method of linear regression. The process is extremely easy as illustrated in the following example.

A Quick Example:

In this example I have exported the income statements for the past six years from my QuickBooks accounting system. The next step is to highlight these five columns (from 2009 through 2013 as shown below), and drag the Fill Handle to project 2014 beginning budget values. *(Please note that in this example I have selected the entire columns and the Fill Handle is shown in the upper right hand corner of the selected range.)*

The screenshot shows an Excel spreadsheet with the following data:

	2009	2010	2011	2012	2013	2014
Ordinary Income/Expense						
Income						
Consulting Income	\$ 317,108.13	\$ 380,529.76	\$ 456,635.71	\$ 547,962.85	\$ 657,555.42	\$ 726,456.27
Other Regular Income	494,950.00	593,940.00	712,728.00	855,273.60	1,026,328.32	1,133,871.06
Reimbursed Expenses	22,362.09	26,834.51	32,201.41	38,641.69	46,370.03	51,228.86
Other Income	67,466.00	80,959.20	97,151.04	116,581.25	139,897.50	154,556.51
Total Income	\$ 901,886.22	\$ 1,082,263.46	\$ 1,298,716.16	\$ 1,558,459.39	\$ 1,870,151.27	\$ 2,066,113.10
Expense						
Automobile Expense	\$ 2,139.55	\$ 2,567.46	\$ 3,080.95	\$ 3,697.14	\$ 4,436.57	\$ 4,901.45
Bank Service Charges	37.34	44.81	53.77	64.52	77.43	85.54
Conference Registration Fees	400.00	480.00	576.00	691.20	829.44	916.35
Contract Labor	26,654.80	31,985.76	38,382.91	46,059.49	55,271.39	61,062.95
Contributions	1,282.53	1,539.04	1,846.84	2,216.21	2,659.45	2,938.12
Dues and Subscriptions	6,051.13	7,261.36	8,713.63	10,456.35	12,547.62	13,862.41
Hardware Purchase	3,950.05	4,740.06	5,688.07	6,825.69	8,190.82	9,049.09
Insurance	11,697.00	14,036.40	16,843.68	20,212.42	24,254.90	26,796.42
Miscellaneous	21,010.25	25,212.30	30,254.76	36,305.71	43,566.85	48,131.96
Office Supplies	6,861.83	8,234.20	9,881.04	11,857.24	14,228.69	15,719.63
Online Computer Services	5,789.74	6,947.69	8,337.23	10,004.67	12,005.60	13,263.60

Using the Fill Handle to Create a Budget for 2014 based on Five Years of Actual Data

Why Does This Work?

But why does this work? How can a simple drag of a mouse create a sophisticated budget? To better understand the underlying workings of this concept, let's start with a more simplified example using simple regression.

Simple Regression Example:

In the screen below we start with three columns of data for the months of **January, February** and **March**.

	A	B	C	D	E	F	G
1	Sales Forecast for the Second Quarter						
2							
3		Jan	Feb	Mar			
4	Dept 1	343	476	588			
5	Dept 2	455	459	755			
6	Dept 3	327	633	589			
7	Dept 4	432	455	512			
8		1,557	2,023	2,444			
9							Jun

Start with Three Simple Columns of Data

Simply highlight the three columns and drag the Fill Handle out an additional three columns. The result is that Excel fills in new columns for **April, May** and **June** – including column headings, column totals and forecast data, as pictured below.

	A	B	C	D	E	F	G
1	Sales Forecast for the Second Quarter						
2							
3		Jan	Feb	Mar	Apr	May	Jun
4	Dept 1	343	476	588	714	837	959
5	Dept 2	455	459	755	856	1,006	1,156
6	Dept 3	327	633	589	778	909	1,040
7	Dept 4	432	455	512	546	586	626
8		1,557	2,023	2,444	2,895	3,339	3,782

The Fill Handle Uses Regression to Project April, May and June

Explaining Regression:

So where does this new data come from? The answer is that Excel uses linear regression to produce this data. Excel evaluates the data for **January, February**, and **March** on a row by row basis, and uses this information to project the subsequent variables. To help you better understand this concept, here is how regression works from a visual perspective:

1. Once again, a simple example using Excel’s Fill handle. The 8 month’s of data yields a projected value of 5,967.

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	A	B	C	D	E	F	G	H	I	J
1	1	2	3	4	5	6	7	8	9	
2	4,325	5,433	4,776	5,223	4,766	5,788	6,223	5,344	5,967	
3										

2. This time we use the same data, but instead of using the Fill handle, we use the **SLOPE** and **INTERCEPT** functions to solve for month 9's projected value.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	1	2	3	4	5	6	7	8	9				
2	4,325	5,433	4,776	5,223	4,766	5,788	6,223	5,344					
3													
4													
5													
6									5,966.64				
7													
8													
9													

Formulas:
 =SLOPE(A2:H2,A1:H1)
 =INTERCEPT(A2:H2,A1:H1)
 =I5+I4*I1

As you can see above, the slope and intercept functions produce the exact same result as does dragging the Fill Handle, thus proving that the math used by Excel is accurate.

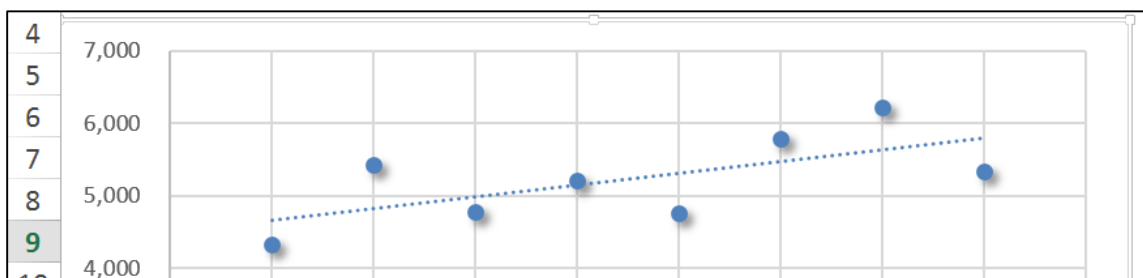
Yet another way to produce the same results is to use the **FORECAST** function, as follows:

	A	B	C	D	E	F	G	H	I
1	1	2	3	4	5	6	7	8	9
2	4,325	5,433	4,776	5,223	4,766	5,788	6,223	5,344	5,967

=FORECAST(I1,A2:H2,A1:H1)

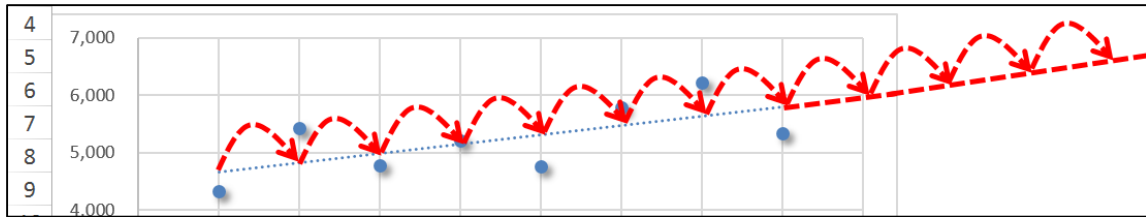
As you can see in this above example, the **FORECAST** function also produces the same result as the Fill Handle and the **SLOPE & INTERCEPT** calculations.

All three of these forecast calculations, which produce the same identical values, can be viewed visually by creating a **Scatter Chart**, and then applying a **Trendline**, as follows:

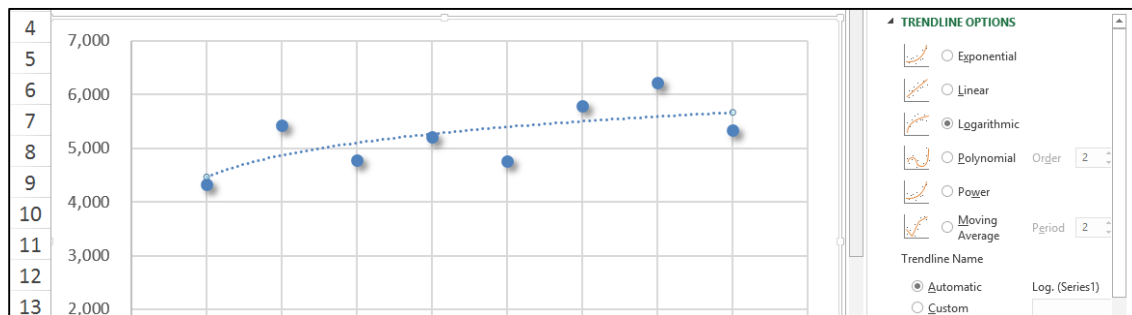


Using Excel to Detect Fraud

The dotted trend line above is based on linear regression as described in the preceding paragraphs. To forecast future values, Excel simply extends this trend line, and then uses the intervals of the original data to plot future values, as suggested by the red dotted arrows below.



Now watch what happens when we base the trendline on logarithmic regression instead of linear regression. In the chart below, we see that the trendline is now curving slightly.



Non-Linear Regression:

Excel provides 5 forms of non-linear regression (as shown in the Trendline Options box in the image above) – Exponential, Logarithmic, Polynomial, Power and Moving Average. Collectively, these 5 Trendline options are based on different forms of non-linear regression, which is explained in detail on this Wikipedia page http://en.wikipedia.org/wiki/Nonlinear_regression. The Wikipedia's explanation is very complicated, but to simplify: non-linear calculations weight the data points differently based on their position on the trendline (with linear regression all data points are weighted the same). Some mathematicians and CPAs maintain that non-linear methods produce more accurate results as more recent data points tend to be more relevant to producing a trend than older data points.

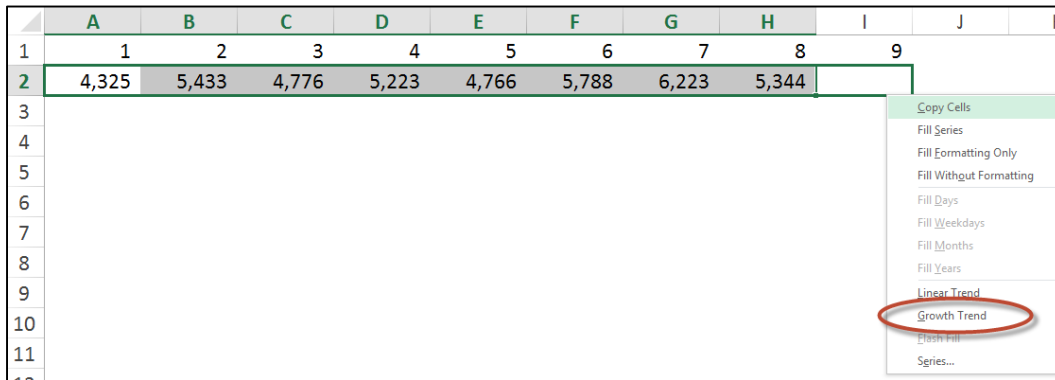
You can calculate forecast values in Excel using the Exponential form of regression by using the **GROWTH** function, as follows.

=GROWTH(A2:H2,A1:H1,I1)										
G	H	I	J	K	L	M	N	O	P	
7	8	9								
6,223	5,344	5,966.64								
		5,995.86								

Using Excel to Detect Fraud

Notice that the projected value for month 9 is 5,995.86 using Exponential regression, which in this example which is 29.22 higher than the projected value based on linear regression.

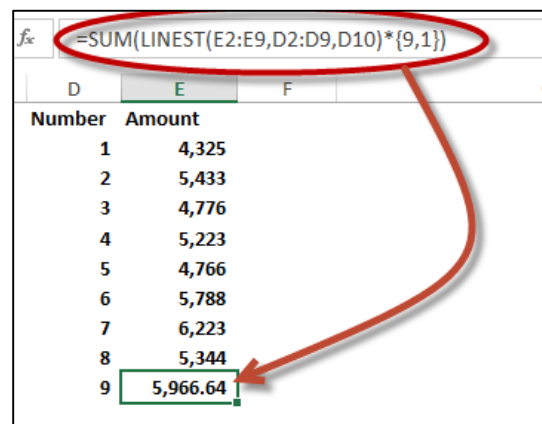
The simplest way to forecast values using **Exponential** regression is to drag the **Fill Handle** while holding down the right mouse button, then selecting Growth from the popup menu as pictured below.



This action will fill in the 9th month with a forecast value based on exponential regression instead of linear regression.

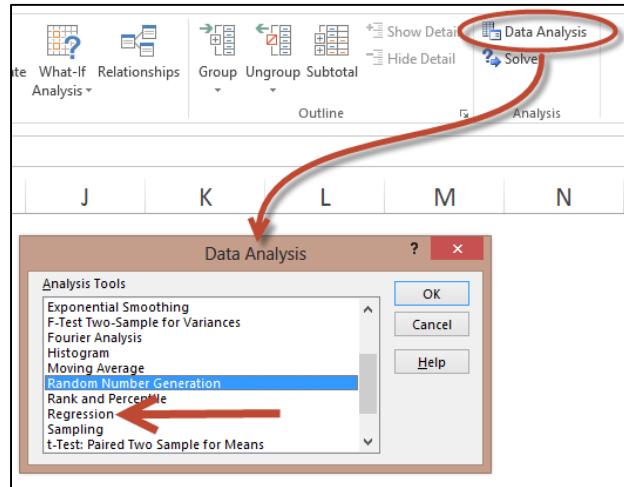
LINEST and TREND Functions

Although not used in this case study, you should be aware that Excel provides two additional forecasting functions - **LINEST** and **TREND**. These functions basically forecast values using linear regression exactly like the **FORECAST** function. The **FORECAST** and **TREND** functions are simpler to use than **LINEST**, but the advantage of the **LINEST** function is that it can also be used as an **Array** function to fill in values for a large range of data. Presented below is a simple example of the **LINEST** function.



Data Analysis ToolPak

To use the LINEST function most efficiently, you should first load Excel's Analysis ToolPak, as follows. From the **File** tab, select **Options, Add-Ins**. In the Manage box, select **Excel Add-ins**, then click **Go**. In the Add-Ins dialog box, select the **Analysis ToolPak** check box, and then click OK. The Data Analysis ToolPak will then appear in your Data Ribbon.



The **Data Analysis ToolPak's** Regression analysis tool uses the **LINEST** function to perform more complicated regression analysis which includes controlling the confidence levels and calculating and plotting residuals. The screenshot below shows an example of the Analysis ToolPak's Regression tool along (shown in the dialog box) and an example of the output generated by this tool beginning in column H. As you can see the output is very complicated, but the resulting output can then be used to fine tune various regression calculations.

Number	Amount
1	4,325
2	5,433
3	4,776
4	5,223
5	4,766
6	5,788
7	6,223
8	5,344

Regression Statistics	
Multiple R	0.918023596
R Square	0.842767324
Adjusted R Square	0.699910181
Standard Error	2232.110395
Observations	8

	df	SS	MS	F	Significance F
Regression	1	186936566.3	186936566.3	37.52000791	0.000865126
Residual	7	34876217.71	4982316.815		
Total	8	221812784			

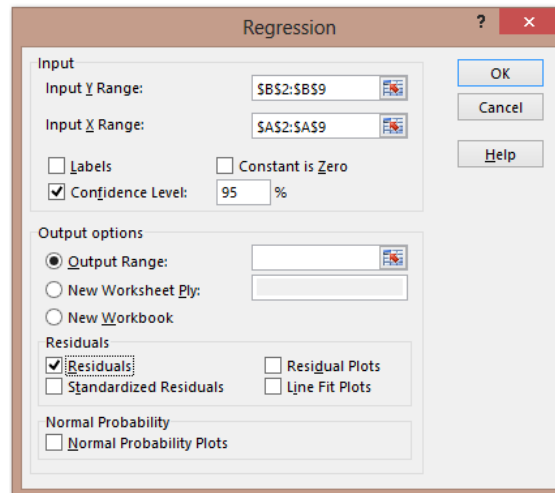
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	957.2647059	156.2789866	6.125357778	0.00047898	587.7236242	1326.805788	587.7236242	1326.805788

Observation	Predicted Y	Residuals
1	957.2647059	3367.735294
2	1914.529412	3518.470588
3	2871.794118	1904.205882
4	3829.058824	1393.941176
5	4786.323529	-20.32352941
6	5743.588235	44.41176471
7	6700.852941	-477.8529412
8	7658.117647	-2314.117647

Percentile	Y
6.25	4325
18.75	4766
31.25	4776
43.75	5223
56.25	5344
68.75	5433
81.25	5788
93.75	6223

Using Excel to Detect Fraud

Closer inspection of the ToolPak's regression tool reveals options for setting the **Constant to Zero**, adjusting the **Confidence Level**, and utilizing a combination of **Residuals**, **Standardized Residuals**, **Residual Plots**, **Line Fit Plots**, and **Normal Probability Plots**.



These detailed aspects of regression are beyond the scope for our particular budgeting purposes, but following are links for those that wish to delve further:

1. The 2002 report *Using Dummy Variables in Regression* by Hun Myoung Park of Indiana University (www.iuj.ac.jp/faculty/kucc625/documents/dummy.pdf) is a good place to start for educating yourself about these variables.
2. This Wikipedia page titled *Errors and residuals in statistics* goes further in depth into residuals. (http://en.wikipedia.org/wiki/Errors_and_residuals_in_statistics)
3. A 6-page Duke University report walking you through an example for using the Data Analysis ToolPak's Regression tool is available here (<http://tinyurl.com/cueqap2>).

Shortcomings with the Data Analysis ToolPak's Regression Tool:

To be fair, I should point out that Excel's ToolPak Regression tool has a number of shortcomings, including:

1. **Missing Functionality** – Other regression tools offer hierarchical regression and case weighting, but Excel's tool does not.
2. **Inadequate Diagnostic Charts** - Several common diagnostic charts are not included in Excel (for example, scatterplot charts, residuals against predicted values, and normality plot of the residuals.) Charting typically goes hand-in-hand with forecasting to help visualize the results.
3. **No Standardized Coefficients** – Without a standardized coefficient, it may be difficult to interpret your results.

4. **Inadequate Diagnostic Statistics** – The lack of collinearity diagnostics makes it more difficult to understand the forecast data model, although Excel’s **PEARSON**, **RSQAURE** and **SKEW** functions could be used to aide in understanding.

Regression Warning

Regression only works when the underlying data follows a consistent trend. If revenue has grown steadily for the past six years, then regression will likely project a reasonable value for year seven. However if revenue has jumped all over the board for the past six years, then regression will likely give you a worthless projection for year seven.

For example, consider that in the past five years gasoline prices jumped from \$1.60 per gallon to more than \$4.00 per gallon. If you use regression to predict gasoline prices for future years based on this prior increase, regression will likely predict gasoline prices in the \$10.00+ per gallon range – but let’s hope that such a prediction would be inaccurate – right?

Testing Data’s Suitability for Regression Calculations

Therefore, you should always visit each line item in the projection and consider whether the projected values make sense. Excel provides at least two good functions to help you accomplish this task – **PEARSON** and **RSQUARE**. For example, in the screen shot below, I have calculated the suitability of 5 different sets of data for regression, using both the **PEARSON** and **R SQUARE** functions. The first data set on row three has a perfect trend and scores a 100% in both the **PEARSON** and **R SQUARE** calculations. However, the data sets that follow are comprised of an increasingly less perfect trend, and the declining **PEARSON** and **R SQUARE** scores reflect this decline.

	A	B	C	D	E	F	G	H	J	K
1									Pearson	R Square
2	1	2	3	4	5	6	7	8		
3	20	40	60	80	100	120	140	160	100%	100%
4										
5	1	2	3	4	5	6	7	8		
6	20	55	111	80	100	120	140	160	93%	86%
7										
8	1	2	3	4	5	6	7	8		
9	20	55	111	80	100	222	140	160	81%	66%
10										
11	1	2	3	4	5	6	7	8		
12	20	55	111	80	100	222	140	333	86%	74%
13										
14	1	2	3	4	5	6	7	8		
15	20	444	111	80	100	222	140	333	21%	4%

For example, I might conclude that the first four sets of data were found to have a sufficient trend as to provide a suitable basis for regression calculations but that the data set in row 15 does not. You should establish your threshold and consistently stick to that threshold. In this case, I might require a minimum 80% **PEARSON** score and 65% **R Square** score in order to justify reliance on that data as a basis for regression forecasting.

Two More Statistical Measures

Two other Excel functions that might also be useful for analyzing the suitability of data for regression include **KURTOSIS** and **SKEW**, which both measure the symmetry of data along a bell curve. For example, data that is perfectly symmetrical will yield a **SKEW** score of 0 (zero). The closer a data's **SKEW** is to zero, the less suitable that data is for regression, because the data's trend is considered unreliable, be it trending upwards or downwards. The **KURTOSIS** works similarly, although it's scoring is different as it is designed to measure multiple peaks, whereas the **SKEW** measures a single Peak.

Alternatives To Regression

If data is found to be inadequate for regression calculations, then other forecasting methods will be necessary. For example, you might:

1. **Inflation Forecasting** - Forecast future amounts based on prior year amounts inflated for inflation, increases in the consumer price index, or some other inflation factor.
2. **Percentage Forecasting** - Forecast future amounts as a percentage of another line item, such as sales or payroll. For example, **Cost of Goods Sold (COGS)** might be forecast as 45% of forecast **Sales** since historically, COGS does approximate that percentage amount. Or you might forecast **Fringe Benefits** as 15% of **Payroll** since historically, **Fringe Benefits** do approximate that percentage amount.
3. **Best Guess Forecasting** - You might come up with another forecast amount based on discussions with department heads. For example, the training budget might be forecast much higher than regression, inflation, or percentage methods because you know that since the new version of Windows 8 and Office 2013 will be implemented, a significantly higher than normal amount of training will be needed to bring everyone up to speed on those products.

Always Use Your Better Numbers When You Have Them

(This should be obvious to all, but I will say it anyway...) Of course some budget line items should never be forecast using regression or other forecasting methods because they are known amounts. For example, regression may suggest that rent expense might be \$236,433.12 for January 2014, but since I have signed a lease agreement, I know that rent expense will be exactly \$220,000 for January 2014, so that is the amount I will use. The same goes for known line items such as depreciation expense, web-hosting expenses, interest payments on outstanding loans,

and any other contractually known obligations. You would always use these more accurate numbers instead of regression's projected numbers.

Critical Key Point to Understand

The key point is that regression represents a starting point for many of the budget line items, but not all budget line items. In all probability, a combination of forecasting methods will need to be applied depending on each particular line item – regression should not be relied upon for all forecast data.

Detailed Budget Example Using Regression

Starting with Dynamics GP

Now that we've discussed the various concepts related to regression, you are now ready to see it in action. In this example, we will start by exporting 4 years' worth of income statement data from Dynamics GP to Microsoft Excel (virtually every accounting system on the planet enables users to complete this step). In Dynamics GP, we start by printing a 36-month income statement to the screen (as pictured below) and exporting it to Excel.

Microsoft Dynamics GP
Home > Financial > Accounts
Microsoft Dynamics GP > Transactions > Inquiry > Reports > Cards

Financial
Screen Output: Income Statement
Income Statement by Month
Report date: 1/1/2011..12/31/2013

Account	Category	Description	1/31/2011	2/28/2011	3/31/2011	4/30/2011	5/31/2011
000-4100-01	Sales	Sales - West	(408,012)	(411,600)	(397,531)	(381,577)	(363,083)
000-4100-02	Sales	Sales - Central	(643,509)	(641,723)	(651,672)	(657,879)	(668,881)
000-4100-03	Sales	Sales - East	(736,957)	(742,564)	(741,848)	(750,266)	(743,750)
000-4100-04	Sales	Sales - Canada	(258,874)	(255,822)	(260,362)	(256,003)	(252,359)
	Sales Total		(2,047,351)	(2,051,709)	(2,051,413)	(2,045,724)	(2,028,073)
000-4120-01	Service	Service Plans - West	(4,643)	(4,394)	(3,783)	(4,625)	(5,831)
000-4120-02	Service	Service Plans - Central	(78,546)	(78,334)	(77,621)	(76,515)	(75,701)
000-4120-03	Service	Service Plans - East	(64,113)	(65,321)	(65,777)	(66,864)	(65,359)
000-4120-04	Service	Service Plans - Canada	(22,335)	(21,854)	(21,819)	(20,338)	(22,041)
	Service Total		(169,638)	(169,904)	(169,001)	(168,342)	(168,932)
000-4130-01	Installation	Installation Charges - West	(13,542)	(13,998)	(14,198)	(13,786)	(14,328)
000-4130-02	Installation	Installation Charges - Central	(145,906)	(146,071)	(145,481)	(144,575)	(146,159)
000-4130-03	Installation	Installation Charges - East	(282,819)	(283,051)	(283,506)	(284,220)	(284,782)
000-4130-04	Installation	Installation Charges - Canada	(87,371)	(88,121)	(88,848)	(89,062)	(88,694)
	Installation Total		(529,637)	(531,240)	(532,034)	(531,643)	(533,963)
000-4140-01	Repair	Repair Charges - East	(2,625)	(4,111)	(5,029)	(5,346)	(4,875)
000-4140-02	Repair	Repair Charges - Central	(26,900)	(28,282)	(28,136)	(28,192)	(27,950)
000-4140-03	Repair	Repair Charges - East	(49,602)	(49,994)	(49,999)	(49,165)	(48,782)
000-4140-04	Repair	Repair Charges - Canada	(12,666)	(12,643)	(12,157)	(12,453)	(11,874)
	Repair Total		(91,793)	(95,030)	(95,322)	(95,157)	(93,480)
000-4180-01	Sales Discounts	Sales Discount - West	9,039	8,731	8,646	8,912	8,364
000-4180-02	Sales Discounts	Sales Discount - Central	150,800	151,586	151,986	150,353	149,532
000-4180-03	Sales Discounts	Sales Discount - East	130,638	129,029	127,719	127,782	126,524
000-4180-04	Sales Discounts	Sales Discount - Canada	38,481	38,519	38,666	39,442	40,028
	Sales Discounts Total		328,958	327,865	327,018	326,490	324,448
000-4183-01	Trade Discounts	Trade Discount - West	3,380	3,783	3,517	3,907	3,826
000-4183-02	Trade Discounts	Trade Discount - Central	53,799	54,871	54,989	54,770	54,857

282 of 379 records selected.

4/13/2008 The Phone Company sa

Next in Excel, Regression Creates the Initial Budget

Once in Excel, to create the initial budget, select the 36 columns with numeric data, then left click and drag the "Fill Handle" out twelve additional columns to create the 2014 budget, as suggested below.

AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV	AW	AX	AY	AZ	BA
10/31/2013	11/30/2013	12/31/2013												
(384,481)	(380,778)	(368,843)												
(735,138)	(724,979)	(731,191)												
(745,591)	(749,975)	(759,558)												
(227,113)	(218,311)	(224,120)												
(2,092,323)	(2,074,043)	(2,083,712)												
(6,706)	(6,362)	(8,841)												
(74,946)	(74,247)	(73,788)												
(66,693)	(64,870)	(66,169)												
(24,516)	(23,640)	(24,113)												
(172,861)	(169,119)	(172,510)												
(13,440)	(13,170)	(14,938)												
(144,267)	(145,231)	(144,460)												
(283,228)	(282,462)	(283,161)												
(95,039)	(95,175)	(95,869)												
(535,975)	(536,038)	(538,428)												
(1,534)	(932)	(1,130)												
(24,649)	(24,299)	(21,833)												
(42,895)	(42,278)	(42,070)												
(4,028)	(4,087)	(3,649)												
(73,106)	(71,595)	(68,681)												
7,225	6,806	8,186												
152,786	152,327	152,356												
126,071	126,620	126,235												
32,629	31,519	33,527												
318,710	317,273	320,304												
7,536	7,635	9,776												
56,014	55,679	54,117												

The result is that Excel uses linear regression analysis to predict the future values. Keep in mind that this is just an initial starting point.

Overwrite those line items where you have better numbers

Once we have completed this process, we then insert better numbers on those line items where we have better budget amounts. For example, the current lease agreement will provide the most accurate amount to use for rent expense. We would use our depreciation schedule to provide the most accurate amounts for depreciation expense. For interest expense, we would look to the loan amortization schedule to prove these numbers (and so on). However for those numbers where you have no better basis to use for budget preparation purposes, why not use linear regression analysis to provide the answer?

To accomplish this task, it is best to use the split screen tool to split the screen into four areas so you can easily see the row descriptions and column headings for the corresponding budget line items you are working with. (Excel 2013 no longer provides split screen tools on the scroll bars as did Excel 2003, 2007 and 2010 – you must click the **Split Screen** tool icon on the **View** tab and then adjust the splits by dragging them). Now scroll each line item and ask yourself if you have a more accurate basis for forecasting that line item, and if so, insert those more accurate values. For example, I have inserted new depreciation values (highlighted in grey) in the screenshot below.

Using Excel to Detect Fraud

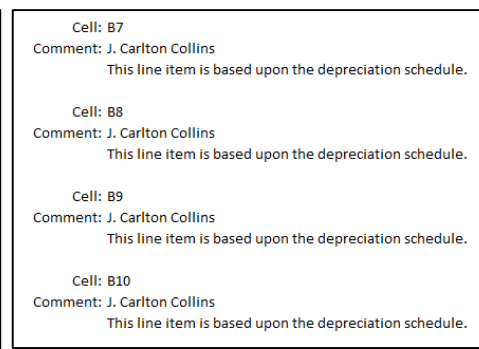
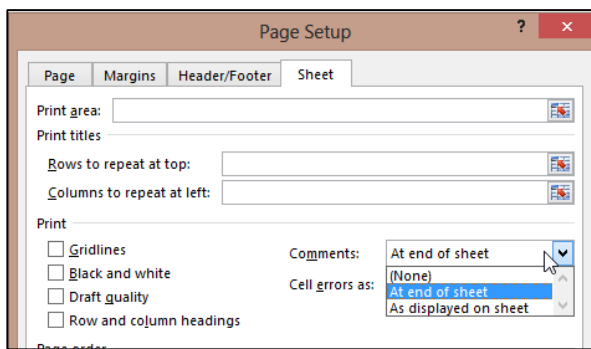
D	E	AP	AQ	AR	AS	AT	AU
Category	Description	1/31/2014	2/28/2014	3/31/2014	4/30/2014	5/31/2014	6/30/2014
Insurance	Liability Insurance	1,058	976	895	813	732	650
Insurance	Casualty Insurance	9,899	9,863	9,827	9,792	9,756	9,720
Insurance Total		13,169	12,800	12,431	12,063	11,694	11,325
Depreciation	Depreciation Expense - Furniture & F	5,100	5,100	5,100	5,100	5,100	5,100
Depreciation	Depreciation Expense - Computer Eq	3,800	3,800	3,800	3,800	3,800	3,800
Depreciation	Depreciation Expense - Machinery &	2,400	2,400	2,400	2,400	2,400	2,400
Depreciation	Depreciation Expense - Fleet Vehicles	22,000	22,000	22,000	22,000	22,000	22,000
Depreciation	Amortization - Software	2,379	2,355	2,332	2,308	2,284	2,260
Depreciation Total		35,679	35,655	35,632	35,608	35,584	35,560
Repairs	Repairs & Maintenance Expense-Stal	10,666	10,789	10,912	11,034	11,157	11,280
Repairs	Repairs & Maintenance Expense-Line	1,652	1,529	1,405	1,282	1,158	1,035
Repairs Total		12,318	12,317	12,317	12,316	12,316	12,315
Purchases	Fixed Assets- Computer Cabinets	(1,365)	(1,477)	(1,588)	(1,700)	(1,812)	(1,924)
Purchases	Salaries and Wages - Purchasing/Rec	8,059	8,025	7,992	7,959	7,925	7,892

Document Your Budget Values

For each line item you change, you should document the basis for that budget line item with an Excel comment, (or some other method such as an adjacent in-cell comment). For example, in the screenshot below, I have inserted **Comments** next to each account description indicating the line item's forecasting basis. Comments are indicated by small red triangles in the upper right corner of a cell and the comment is displayed whenever you hover over the red tick mark with your mouse.

69		29,772	29,782	2	13,169
70	Depreciation Expense - Furniture & F	753	945		5,100
71	Depreciation Expense - Computer Eq	7,855	6,368		3,800
72	Depreciation Expense - Machinery &	2,400	6,728		2,400
73	Depreciation Expense - Fleet Vehicles	22,000	9,794	1	22,000
74	Amortization - Software		3,338		2,379
75			7,174	2	35,679
76	Repairs & Maintenance Expense-Stal	7,554	6,436		10,666
77	Repairs & Maintenance Expense-Line	5,552	5,085		1,652
78		13,106	11,521	1	12,318
79	Fixed Assets- Computer Cabinets	2,114	1,619		(1,365)
80	Salaries and Wages - Purchasing/Rec	8,004	6,934		8,059
81	Overtime Pay - Purchasing/Receiving	10,497	9,883		11,076
82	Bonuses - Purchasing/Receiving	10,395	11,416	1	14,940

To print comments, select **Page Setup** from the **Page Layout** tab, and on the **Sheet** tab select **At end of the sheet** from the **Comments** dropdown box, as pictured on the left below. Note that the comments do not show up in Print Preview, but they do appear as a printed page at the end of your print out; an example of which is pictured on the right below.



Testing Data for Regression Suitability

Next we will test each line item’s data for regression suitability. This step will help us determine which rows, if any, need to be forecast using a method other than regression. We start this process by labeling a couple of blank columns **Pearson** and **R Square**, then enter the respective formulas to test the 36 columns of data row-by-row, as shown below, on the left.

	AY	AZ	BA	BB	BC
1					
3					
4				Pearson	R Square
5	10/31/2014	11/30/2014	12/31/2014		
6	(365,857)	(365,559)	(365,260)	24%	5%
7	(756,949)	(759,525)	(762,101)	-93%	85%
8	(764,543)	(765,041)	(765,540)	-38%	14%
9	(212,064)	(210,858)	(209,653)	88%	76%
10	(2,099,414)	(2,100,984)	(2,102,554)	-74%	52%
11	(9,843)	(9,943)	(10,044)	-69%	46%
12	(73,300)	(73,251)	(73,202)	31%	9%
13	(66,872)	(66,942)	(67,012)	-50%	23%
14	(25,122)	(25,223)	(25,324)	-76%	55%
15	(175,137)	(175,360)	(175,582)	-67%	43%
16	(15,209)	(15,236)	(15,263)	-36%	12%
17	(144,025)	(143,981)	(143,938)	28%	7%

Notice that both the **PEARSON** and **R SQUARE** formulas return percentage values that are both negative and positive, which means the data is trending upward or downward. Since we don’t care which direction the data is trending, (we only care that it scores high), we can edit the formulas to include the **ABSOLUTE** function (**ABS**) which changes all amounts to positive numbers, as picture above on the right.

Now we can set our thresholds to minimum scores, let’s say 50% (Pearson) and 40% (R Square) for example, then apply conditional formatting to flush out those line items that meet our stated criteria. As pictured to the right, those line items in columns BB and BC containing formatting are not suitable for regression based on our stated criterion level, and another forecasting method will need to be used to forecast those amounts. For example, we may simply use last year’s number inflated by the consumer price index.

	AY	AZ	BA	BB	BC
37	90,320	90,100	89,881	77%	57%
38	129,144	129,175	129,206	16%	2%
39	40,504	40,423	40,342	50%	23%
40	270,255	270,070	269,885	75%	55%
41	18,490	18,793	19,095	96%	91%
42	94,139	94,017	93,896	81%	64%
43	132,699	132,837	132,975	71%	49%
44	42,763	42,607	42,450	82%	66%
45	288,091	288,254	288,416	60%	34%
46	(3,604)	(3,670)	(3,736)	70%	47%
47	248	202	155	31%	9%
48	3,318	3,418	3,518	79%	60%
49	4,924	5,101	5,278	66%	42%
50	13,004	13,273	13,543	96%	91%
51	(8,027)	(8,236)	(8,444)	90%	80%
52	9,678	9,852	10,025	87%	74%
53	(9,951)	(10,164)	(10,378)	94%	88%
54	(9,843)	(10,083)	(10,323)	91%	82%
55	(253)	(307)	(362)	19%	3%
56	5,095	5,240	5,384	90%	80%
57	208,956	208,827	208,697	79%	61%
58	9,388	9,346	9,304	40%	15%
59	(6,244)	(6,540)	(6,835)	85%	71%
60	13,104	13,209	13,315	89%	78%
61	2,416	2,232	2,048	83%	68%
62	1,632	1,423	1,215	87%	75%
63	6,231	6,416	6,602	72%	50%
64	240,578	240,154	239,730	76%	56%
65	8,414	8,375	8,335	37%	13%
66	(8,467)	(8,679)	(8,891)	86%	72%
67	324	243	161	57%	31%
68	9,577	9,542	9,506	24%	5%
69	9,849	9,480	9,112	76%	56%
70	5,629	5,755	5,880	80%	62%
71	3,511	3,435	3,358	72%	49%
72	1,896	1,800	1,705	79%	61%
73	23,011	23,335	23,659	96%	92%
74	2,165	2,141	2,117	28%	7%
75	36,213	36,466	36,719	70%	47%
76	11,772	11,895	12,017	82%	65%
77	541	417	294	89%	78%
78	12,312	12,312	12,311	1%	0%

Budget Totals

Now that we have generated regression amounts, and overwritten those amounts where we have more accurate numbers and also those where regression is not suitable, we continue by totaling the 12 months to produce the annual 2014 budget amounts, as pictured below.

	8/31/2014	9/30/2014	10/31/2014	11/30/2014	12/31/2014	2014 Total
6	(366,455)	(366,156)	(365,857)	(365,559)	(365,260)	(4,402,830)
7	(751,798)	(754,374)	(756,949)	(759,525)	(762,101)	(8,975,209)
8	(763,546)	(764,044)	(764,543)	(765,041)	(765,540)	(9,153,578)
9	(214,475)	(213,270)	(212,064)	(210,858)	(209,653)	(2,595,401)
10	(2,096,273)	(2,097,844)	(2,099,414)	(2,100,984)	(2,102,554)	(25,127,018)
11	(9,643)	(9,743)	(9,843)	(9,943)	(10,044)	(113,907)
12	(73,397)	(73,349)	(73,300)	(73,251)	(73,202)	(881,646)
13	(66,731)	(66,801)	(66,872)	(66,942)	(67,012)	(799,508)
14	(24,921)	(25,021)	(25,122)	(25,223)	(25,324)	(297,230)
15	(174,692)	(174,914)	(175,137)	(175,360)	(175,582)	(2,092,292)
16	(15,155)	(15,182)	(15,209)	(15,236)	(15,263)	(181,370)
17	(144,112)	(144,068)	(144,025)	(143,981)	(143,938)	(1,730,125)
18	(282,923)	(282,894)	(282,864)	(282,834)	(282,804)	(3,395,614)
19	(97,073)	(97,224)	(97,374)	(97,524)	(97,675)	(1,162,169)
20	(539,263)	(539,367)	(539,472)	(539,576)	(539,680)	(6,469,278)
21	(140)	(17)	107	231	354	(3,909)

The purpose of totaling the annual budget is so we can adjust the monthly budget for seasonality, as discussed below.

Adjusting for Seasonality

Annual budget amounts are not very useful because they do not allow you to compare actual to budgeted results on a monthly basis – you must produce monthly budget amounts. However, simply dividing an annual budget by 12 to produce monthly amounts is not good enough because many line items are typically seasonal. For example, actual revenue may be twice as high in some months compared to other months, but comparing these seasonal sales amounts to a non-seasonal budget is virtually meaningless because you can't tell whether you are on target, off target, or by how much. Therefore, it is difficult to determine whether corrective measures are needed on a month to month basis.

Seasonal budgets make a big difference. I believe one of the primary reasons companies fail to properly analyze their budgets to actuals throughout the year is because their budgets are not seasonal to begin with, and therefore such comparisons are virtually meaningless.

To add seasonality to your budget; simply spread the annual amount of each budget line item across the 12 months based on the ratio of last's year's monthly amounts compared to last year's annual amount, as follows.

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Start by creating column headings for the seasonal budget, as pictured below.

AY	AZ	BA	BB	BC	BD	BE	BF	BG	BH	BI	BJ	BK	BL	BM	BN
10/31/2014	11/30/2014	12/31/2014	2014 Total	1/31/2014	2/28/2014	3/31/2014	4/30/2014	5/31/2014	6/30/2014	7/31/2014	8/31/2014	9/30/2014	10/31/2014	11/30/2014	12/31/2014
(365,857)	(365,559)	(365,260)	(4,402,830)												
(756,949)	(759,525)	(762,101)	(8,975,209)												

Next, enter a formula using last year's January value (as of January 2013) as a the numerator and the **SUM** of all of 2013's values as the denominator, and then multiplied times the 2014 annual budget amount (**=AD6/SUM(\$AD6:\$AO6)*\$BB6**), as pictured below.

=AD6/SUM(\$AD6:\$AO6)*\$BB6					
	AZ	BA	BC	BD	BE
2014	12/31/2014	2014 Total	1/31/2014	2/28/2014	3/31/2014
5,559	(365,260)	(4,402,830)	(362,903.88)		
9,525	(762,101)	(8,975,209)			
5,041	(765,540)	(9,153,578)			
0,858	(209,653)	(2,595,401)			
0,984	(2,102,554)	(25,127,018)			

Notice in this formula I have used dollar signs to anchor the column references so that I may copy the formula down and across to complete the seasonality adjustments.

11/30/2014	12/31/2014	2014 Total	1/31/2014	2/28/2014	3/31/2014	4/30/2014	5/31/2014	6/30/2014
(365,559)	(365,260)	(4,402,830)	(362,903.88)	(362,903.88)	(362,903.88)	(359,212.72)	(366,632.67)	(362,603.60)
(759,525)	(762,101)	(8,975,209)	(719,409.39)	(730,040.66)	(739,117.82)	(741,515.58)	(741,454.61)	(751,384.88)
(765,041)	(765,540)	(9,153,578)	(774,888.41)	(778,065.95)	(772,370.68)	(762,877.96)	(748,564.47)	(754,722.33)
(210,858)	(209,653)	(2,595,401)	(218,17.23)	(222,228.44)	(215,202.27)	(207,136.46)	(225,332.28)	(222,209.34)
(2,100,984)	(2,102,554)	(25,127,018)	#####	#####	#####	#####	#####	#####
(9,943)	(10,044)	(113,907)	(10,15.66)	(10,269.79)	(9,882.86)	(11,154.00)	(10,221.24)	(9,248.48)
(73,251)	(73,202)	(881,646)	(72,345.61)	(73,308.57)	(73,421.22)	(73,625.58)	(74,218.75)	(74,338.14)
(66,942)	(67,012)	(799,508)	(65,379.95)	(66,629.06)	(66,019.55)	(64,704.74)	(65,976.11)	(66,504.31)
(25,223)	(25,324)	(297,230)	(24,30.33)	(24,931.59)	(23,714.28)	(22,712.10)	(23,429.60)	(24,292.01)
(175,360)	(175,582)	(2,092,292)	(172,717.78)	(175,009.99)	(173,019.74)	(172,033.21)	(173,814.05)	(174,467.23)
(15,236)	(15,263)	(181,370)	(15,265.20)	(15,186.54)	(14,107.76)	(14,323.45)	(15,310.63)	(15,901.71)
(143,981)	(143,938)	(1,730,125)	(142,188.25)	(143,089.06)	(144,130.55)	(145,264.64)	(145,668.30)	(145,382.17)

Rounding & Formatting

It is rather senseless to produce budgets with pennies, or even dollars; I recommend rounding the results by editing the seasonality formula. Edit the seasonality formula adding the **ROUND** function in front of the formula and **"-2"** to the end of the formula to round to the nearest hundredths, as pictured.

=ROUND((AD6/SUM(\$AD6:\$AO6)*\$BB6),-2)

Now recopy this revised formula (overwriting the previous seasonally adjusted budget data) to update the budget.

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11/30/2014	12/31/2014	2014 Total	1/31/2014	2/28/2014	3/31/2014	4/30/2014	5/31/2014	6/30/2014
(365,559)	(365,260)	(4,402,830)	(362,900.00)	(350,500.00)	(363,900.00)	(359,200.00)	(366,600.00)	(362,600.00)
(759,525)	(762,101)	(8,975,209)	(719,500.00)	(730,000.00)	(739,100.00)	(741,500.00)	(751,400.00)	(755,000.00)
(765,041)	(765,540)	(9,153,578)	(775,000.00)	(778,100.00)	(772,400.00)	(762,900.00)	(748,600.00)	(754,700.00)
(210,858)	(209,653)	(2,595,401)	(218,000.00)	(222,200.00)	(215,200.00)	(207,100.00)	(225,300.00)	(222,200.00)
(2,100,984)	(2,102,554)	(25,127,018)	#####	#####	#####	#####	#####	#####
(9,943)	(10,044)	(113,907)	(10,000.00)	(10,300.00)	(9,900.00)	(11,200.00)	(10,200.00)	(9,200.00)
(73,251)	(73,202)	(881,646)	(72,000.00)	(73,300.00)	(73,400.00)	(73,600.00)	(74,200.00)	(74,300.00)
(66,942)	(67,012)	(799,508)	(65,000.00)	(66,600.00)	(66,000.00)	(64,700.00)	(66,000.00)	(66,500.00)
(25,223)	(25,324)	(297,230)	(24,000.00)	(24,900.00)	(23,700.00)	(22,700.00)	(23,400.00)	(24,300.00)
(175,360)	(175,582)	(2,092,292)	(172,000.00)	(175,000.00)	(173,000.00)	(172,000.00)	(173,800.00)	(174,500.00)
(15,236)	(15,263)	(181,370)	(15,000.00)	(15,200.00)	(14,100.00)	(14,300.00)	(15,300.00)	(15,900.00)
(143,981)	(143,938)	(1,730,125)	(142,200.00)	(143,100.00)	(144,100.00)	(145,300.00)	(145,700.00)	(145,400.00)

Finally, select a formatted column (such as column BA in this example) and click the Format Painter tool; then highlight the twelve months budget to apply the formatting, as suggested below.

The screenshot shows an Excel spreadsheet with a budget table. A red dashed arrow labeled 'Formatting' points from column BA to the rest of the table. The 'Format Painter' icon in the ribbon is circled in red. The table data is as follows:

2014	12/31/2014	2014 Total	1/31/2014	2/28/2014	3/31/2014	4/30/2014	5/31/2014	6/30/2014	7/31/2014	8/31/2014
(365,559)	(365,260)	(4,402,830)	(362,900)	(350,500)	(363,900)	(359,200)	(366,600)	(362,600)	(368,900)	(368,900)
(759,525)	(762,101)	(8,975,209)	(719,500)	(730,000)	(739,100)	(741,500)	(751,400)	(755,000)	(755,000)	(755,000)
(765,041)	(765,540)	(9,153,578)	(775,000)	(778,100)	(772,400)	(762,900)	(748,600)	(754,700)	(754,700)	(754,700)
(210,858)	(209,653)	(2,595,401)	(218,000)	(222,200)	(215,200)	(207,100)	(225,300)	(222,200)	(213,700)	(213,700)
(2,100,984)	(2,102,554)	(25,127,018)	#####	#####	#####	#####	#####	#####	#####	#####
(9,943)	(10,044)	(113,907)	(10,000)	(10,300)	(9,900)	(11,200)	(10,200)	(9,200)	(8,700)	(8,700)
(73,251)	(73,202)	(881,646)	(72,000)	(73,300)	(73,400)	(73,600)	(74,200)	(74,300)	(74,300)	(74,300)
(66,942)	(67,012)	(799,508)	(65,000)	(66,600)	(66,000)	(64,700)	(66,000)	(66,500)	(67,300)	(67,300)
(25,223)	(25,324)	(297,230)	(24,000)	(24,900)	(23,700)	(22,700)	(23,400)	(24,300)	(24,700)	(24,700)
(175,360)	(175,582)	(2,092,292)	(172,000)	(175,000)	(173,000)	(172,000)	(173,800)	(174,500)	(175,200)	(175,200)
(15,236)	(15,263)	(181,370)	(15,000)	(15,200)	(14,100)	(14,300)	(15,300)	(15,900)	(16,900)	(16,900)
(143,981)	(143,938)	(1,730,125)	(142,200)	(143,100)	(144,100)	(145,300)	(145,700)	(145,400)	(144,900)	(144,900)
(157,623)	(157,623)	(1,834,524)	(158,000)	(158,000)	(157,000)	(157,000)	(158,000)	(158,000)	(158,000)	(158,000)

This Income Statement Budget Is Not Yet Completed

At this point, we have prepared a complete monthly budget using regression supplemented with other forecasting methods, and this effort may be sufficient for your needs. However, please be aware that this budget example was simplified in order to more easily convey Excel's regression tools and concepts. There is more to the process for those truly dedicated to creating the most accurate budget possible – keep reading.

Forecasting Revenue

In the example above, for the purpose of explaining regression as simply as possible, I treated the budgeting process for revenue exactly the same as the budgeting process for expenses, but in reality budgeting revenue is usually a different process from budgeting expenses.

For established companies, many projected expenses can be reasonably determined using regression, inflation, percentage of sales or best guess forecasting methods. However, revenue is subject to far greater external factors such as competition, marketing, the state of the economy, inflationary pressures, changing attitudes, etc. For example, the appearance of a new competitor in the marketplace could steal away market share and thus negatively impact

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revenue. For example, in late 2012 Apple shares fell from \$700 a share to almost \$400 a share for no other reason than the prospects that Microsoft's, Google's and Samsung's new tablet PC offerings were expected to eat into Apple's market share.

Negative press related to the quality of your product (such as the gas pedal sticking for Toyotas) could adversely affect sales. By contrast, your product may become wildly popular if a well know celebrity starts wearing or using your product. A good marketing campaign can help significantly, or hurt if it happens to make the wrong impression.

The point is that regression is unable to incorporate factors like this, therefore a more detailed forecasting approach is usually needed. A good budget will consider all of the relevant factors and in the end, you may produce multiple budgets given differing anticipated scenarios.

Simple Example of Revenue Projection Based on Units

In the following example, Crazy Fred's has listed the number of training courses scheduled for each month of the budget year, and has projected attendance for each month based on the average attendance achieved in previous years for those same months. Crazy Fred charges a course fee of \$100 per attendee, which is input in cell **A8**. Crazy Fred also knows that the fixed cost of printing the training manual and having the food catered will be \$22 and \$27, respectively – as input into cells **A11** and **A12**.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
1	Crazy Fred's Training															
2																
3			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	
4		Number of Training Courses	10	20	25	10	-	10	10	30	30	25	20	20		
5		Projected Attendees Per Course	19.6	22.3	24.0	18.4	-	17.3	16.5	42.3	41.7	38.4	25.3	21.2		
6		Projected Total Attendees	196	446	600	184	-	173	165	1,269	1,251	960	506	424	6,174	
7																
8	\$	100.00	Revenue	19,600	44,600	60,000	18,400	-	17,300	16,500	126,900	125,100	96,000	50,600	42,400	617,400
9																
10		Variable Costs:														
11	\$	22.00	Materials	4,312	9,812	13,200	4,048	-	3,806	3,630	27,918	27,522	21,120	11,132	9,328	
12	\$	27.00	Food	5,292	12,042	16,200	4,968	-	4,671	4,455	34,263	33,777	25,920	13,662	11,448	
13			Total Variable Costs	9,604	21,854	29,400	9,016	-	8,477	8,085	62,181	61,299	47,040	24,794	20,776	
14																
15		Fixed Costs:														
16			Meeting Room Lease	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	1250	
17			Brochures & Marketing	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	
18			Miscellaneous	500	500	500	500	500	500	500	500	500	500	500	500	
19				3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	3,250	
20																
21			Profit or (Loss):	6,746	19,496	27,350	6,134	(3,250)	5,573	5,165	61,469	60,551	45,710	22,556	18,374	
22																

Notice that this projection method does is not based on historical revenue amounts, only historical attendance figures have been used. In this example, the company knows how many classroom venues have been booked and has a fairly decent idea as to what attendance might be; therefore, regression based on historical revenue amounts would not be as accurate as using these known quantities to forecast revenues.

A more sophisticated example of forecasting revenues based on units of production is shown below. In this example, a CPA firm has listed each employee along with each employee's budgeted billable hours and billing rates by month.

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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	CPA Firm Budget															
2				15.0%	11.4%	12.4%	11.1%	5.1%	4.8%	4.2%	6.0%	6.1%	6.3%	8.3%	9.3%	100.0%
3	Billable Hours															
4	Employee Name	Title	Annual	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	
5	Jennifer W.	Partner	1,000	150.0	114.0	124.0	111.0	51.0	48.0	42.0	60.0	61.0	63.0	83.0	93.0	1,000.0
6	Lynne C.	Partner	1,000	150.0	114.0	124.0	111.0	51.0	48.0	42.0	60.0	61.0	63.0	83.0	93.0	1,000.0
7	Brenda J.	Manager	1,200	180.0	136.8	148.8	133.2	61.2	57.6	50.4	72.0	73.2	75.6	99.6	111.6	1,200.0
8	David S.	Manager	1,200	180.0	136.8	148.8	133.2	61.2	57.6	50.4	72.0	73.2	75.6	99.6	111.6	1,200.0
9	Billy T.	Supervisor	1,400	210.0	153.6	173.6	155.4	71.4	67.2	58.8	84.0	85.4	88.2	116.2	130.2	1,400.0
10	Craig R.	Supervisor	1,400	210.0	153.6	173.6	155.4	71.4	67.2	58.8	84.0	85.4	88.2	116.2	130.2	1,400.0
11	Sandra H.	Supervisor	1,400	210.0	153.6	173.6	155.4	71.4	67.2	58.8	84.0	85.4	88.2	116.2	130.2	1,400.0
12	Mary U.	Senior	1,650	247.5	188.1	204.6	183.2	84.2	79.2	69.3	99.0	100.7	104.0	137.0	153.5	1,650.0
13	Kris P.	Senior	1,650	247.5	188.1	204.6	183.2	84.2	79.2	69.3	99.0	100.7	104.0	137.0	153.5	1,650.0
14	Karen B.	Senior	1,650	247.5	188.1	204.6	183.2	84.2	79.2	69.3	99.0	100.7	104.0	137.0	153.5	1,650.0
15	Phillip L.	Senior	1,650	247.5	188.1	204.6	183.2	84.2	79.2	69.3	99.0	100.7	104.0	137.0	153.5	1,650.0
16	Nancy H.	Staff	1,800	270.0	205.2	223.2	199.8	91.8	86.4	75.6	108.0	109.8	113.4	149.4	167.4	1,800.0
17	Jerry M.	Staff	1,800	270.0	205.2	223.2	199.8	91.8	86.4	75.6	108.0	109.8	113.4	149.4	167.4	1,800.0
18	Benson G.	Staff	1,800	270.0	205.2	223.2	199.8	91.8	86.4	75.6	108.0	109.8	113.4	149.4	167.4	1,800.0
19	Gloria K.	Staff	1,800	270.0	205.2	223.2	199.8	91.8	86.4	75.6	108.0	109.8	113.4	149.4	167.4	1,800.0
20	Christine W.	Staff	1,800	270.0	205.2	223.2	199.8	91.8	86.4	75.6	108.0	109.8	113.4	149.4	167.4	1,800.0
21																
22	Billing Rates															
23	Employee Name	Title		Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	
24	Jennifer W.	Partner	215	215	215	215	215	215	215	225	225	225	225	225	225	225
25	Lynne C.	Partner	225	225	225	225	225	225	225	235	235	235	235	235	235	235
26	Brenda J.	Manager	165	165	165	165	165	165	165	175	175	175	175	175	175	175
27	David S.	Manager	175	175	175	175	175	175	175	185	185	185	185	185	185	185
28	Billy T.	Supervisor	125	125	125	125	125	125	125	135	135	135	135	135	135	135
29	Craig R.	Supervisor	115	115	115	115	115	115	115	125	125	125	125	125	125	125
30	Sandra H.	Supervisor	115	115	115	115	115	115	115	125	125	125	125	125	125	125
31	Mary U.	Senior	85	85	85	85	85	85	85	95	95	95	95	95	95	95
32	Kris P.	Senior	85	85	85	85	85	85	85	95	95	95	95	95	95	95
33	Karen B.	Senior	85	85	85	85	85	85	85	95	95	95	95	95	95	95
34	Phillip L.	Senior	85	85	85	85	85	85	85	95	95	95	95	95	95	95
35	Nancy H.	Staff	60	60	60	60	60	60	60	70	70	70	70	70	70	70
36	Jerry M.	Staff	60	60	60	60	60	60	60	70	70	70	70	70	70	70
37	Benson G.	Staff	60	60	60	60	60	60	60	70	70	70	70	70	70	70
38	Gloria K.	Staff	60	60	60	60	60	60	60	70	70	70	70	70	70	70
39	Christine W.	Staff	60	60	60	60	60	60	60	70	70	70	70	70	70	70
40																
41	Total Revenue:															
42	Employee Name	Title		Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Total
43	Jennifer W.	Partner	32,250	24,510	26,660	23,865	10,965	10,320	9,450	13,500	13,725	14,175	18,675	20,925	219,020	
44	Lynne C.	Partner	33,750	25,650	27,900	24,975	11,475	10,800	9,870	14,100	14,335	14,805	19,505	21,855	229,020	
45	Brenda J.	Manager	29,700	22,572	24,552	21,978	10,098	9,504	8,820	12,600	12,810	13,230	17,430	19,530	202,824	
46	David S.	Manager	31,500	23,940	26,040	23,310	10,710	10,080	9,324	13,320	13,542	13,986	18,426	20,646	214,824	
47	Billy T.	Supervisor	26,250	19,950	21,700	19,425	8,925	8,400	7,938	11,340	11,529	11,907	15,687	17,577	180,628	
48	Craig R.	Supervisor	24,150	18,354	19,964	17,871	8,211	7,728	7,350	10,500	10,675	11,025	14,525	16,275	166,628	
49	Sandra H.	Supervisor	24,150	18,354	19,964	17,871	8,211	7,728	7,350	10,500	10,675	11,025	14,525	16,275	166,628	
50	Mary U.	Senior	21,038	15,989	17,391	15,568	7,153	6,732	6,584	9,405	9,562	9,875	13,010	14,578	146,883	
51	Kris P.	Senior	21,038	15,989	17,391	15,568	7,153	6,732	6,584	9,405	9,562	9,875	13,010	14,578	146,883	
52	Karen B.	Senior	21,038	15,989	17,391	15,568	7,153	6,732	6,584	9,405	9,562	9,875	13,010	14,578	146,883	
53	Phillip L.	Senior	21,038	15,989	17,391	15,568	7,153	6,732	6,584	9,405	9,562	9,875	13,010	14,578	146,883	
54	Nancy H.	Staff	16,200	12,312	13,392	11,988	5,508	5,184	5,292	7,560	7,686	7,938	10,458	11,718	115,236	
55	Jerry M.	Staff	16,200	12,312	13,392	11,988	5,508	5,184	5,292	7,560	7,686	7,938	10,458	11,718	115,236	
56	Benson G.	Staff	16,200	12,312	13,392	11,988	5,508	5,184	5,292	7,560	7,686	7,938	10,458	11,718	115,236	
57	Gloria K.	Staff	16,200	12,312	13,392	11,988	5,508	5,184	5,292	7,560	7,686	7,938	10,458	11,718	115,236	
58	Christine W.	Staff	16,200	12,312	13,392	11,988	5,508	5,184	5,292	7,560	7,686	7,938	10,458	11,718	115,236	
59				366,900	278,844	303,304	271,506	124,746	117,408	112,896	161,280	163,968	163,344	223,104	249,984	2,543,284
60																

In this example, projected revenue is again based upon units rather than historical revenue amounts, as regression methods applied to historical revenue amounts would likely yield less accurate projections.

Keep in mind that revenue is often more volatile than expenses. An effective marketing program might increase the number of units sold, a bad economy might adversely affect the number of units sold. Any foreseen or expected events like these should be incorporated into the budget and explained in detail.

In conclusion, while the regression example above was used to forecast both revenue and expenses, in many cases regression should probably only be used as a means of forecasting expenses only.

Budgeting Balance Sheets and Cash Flow

In many cases, budgets consist of a profit and loss statement only, but I believe this falls short.

By creating a budgeted balance sheet and cash flow statement, (which requires the creation of a budgeted balance sheet), a company can truly monitor expected results for every account, including the all-important cash flow balance. The process starts by forecasting the balance sheet and once created, forecasting cash flow is a simple matter of crunching the numbers.

To produce a budgeted balance sheet, assumptions are needed related to the days in accounts receivable, accounts payable and inventory. These day calculations are best derived by examining the historical days in accounts receivable, accounts payable and inventory for recent years, and using those amounts as a guide. For example:

1. **AR** - The budgeted accounts receivable balance may be calculated as 46 days of the prior month's sales.
2. **AP** - The budgeted accounts payable balance may be calculated as 28 days of the prior month's variable expenses.
3. **Inventory** - The budgeted inventory balance may be calculated as 62 days of the prior month's COGS amount.
4. **Loan Payments** – Loan repayments should be budgeted based on the actual amortization schedules, based on the principle payment amounts.
5. And so on.

Once the balance sheet items have been budgeted, the resulting cash flow budget is computed as follows:

Using Excel to Detect Fraud

	A	B	C	D	E	F	G	H	I
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
2									
3	Beginning Cash		1,000	3,500	6,450	8,150	8,060	7,500	8,010
4									
5	Budgeted P&L:								
6	Revenue		10,000	11,000	12,100	8,000	6,200	15,000	16,500
7	COGS		4,000	4,400	4,840	3,200	2,480	6,000	6,600
8	Gross Margin		6,000	6,600	7,260	4,800	3,720	9,000	9,900
9									
10	Expense 1		500	-	-	-	500	-	-
11	Expense 2		600	1,450	1,750	1,200	800	600	600
12	Expense 3		200	200	200	700	700	1,000	1,000
13	Expense 4		400	400	400	-	-	600	600
14	Expense 5		700	200	450	500	600	600	300
15	Expense 6		1,200	1,200	2,800	3,300	2,100	4,300	3,000
16	Expense 7		100	200	100	200	50	50	100
17	Total Expenses		3,700	3,650	5,700	5,900	4,750	7,150	5,600
18									
19	Profit/Loss		2,300	2,950	1,560	(1,100)	(1,030)	1,850	4,300
20									
21	Budgeted Balance Sheet:								
22	A/R (46 days of sales)	1,150	1,260	1,390	1,520	1,010	780	1,890	2,080
23	A/P (28 days of expenses)	(270)	(270)	(270)	(410)	(430)	(350)	(520)	(410)
24	Inventory (62 days of COGS)	790	680	750	820	540	420	1,020	1,120
25	Loan Balance (From Amort. Schedule)	4,200	4,000	3,800	3,600	3,400	3,200	3,000	2,800
26									
27	Change in A/R		(110)	(130)	(130)	510	230	(1,110)	(190)
28	Change in A/P		-	-	140	20	(80)	170	(110)
29	Change in Inventory		110	(70)	(70)	280	120	(600)	(100)
30	Change in Loan		200	200	200	200	200	200	200
31									
32	Ending Cash		3,500	6,450	8,150	8,060	7,500	8,010	12,110

The area in yellow (rows 5 through 19) shows the profit and loss budget as projected using the methods described earlier above. The blue area (rows 21 through 25) depicts the assumptions and the changes in balance sheet balances. The green areas (rows 26 through 32) represent the forecast balance sheets and cash flow forecast. Because the income statement is seasonalized, the balance sheet balances and cash flow forecast will also be seasonalized.

Profit Margin Monitoring & Calculating Your Desired Profit Margin

It is also useful for companies to budget and monitor their profit margins; a profit margin that misses its target speaks volumes. Once established, budget to actual profit margin comparisons can also be used as benchmarks to help detect fraud, errors or irregularities. To calculate your desired profit margin, I suggest that you work backwards by asking yourself (or your client) two simple questions, for example: Let's assume that Burt has owned and operated a construction company store for the past 17 years. As his CPA, I ask him two questions as follows: How much profit do you want to make next year and how much sales do you anticipate next year?

Burt responds – “that’s easy, we’ve been growing at 8% a year for the past five years and last year (2013) we nearly reached \$12 million sales, so we will probably hit \$13 million in revenue next year (2014). Also, I’d like to make a million dollars profit – I think that’s a reasonable goal.”

With just this little bit of data, we can work backwards based on Burt's prior year financial statements and advise him as follows:

Using Excel to Detect Fraud

	A	B	C	D	E	F	G	H	I	J
1		Burt's Construction Company								
2			<u>Actual 2013</u>	<u>2014??</u>						
3		40100 - Construction Income								
4		40100 - Construction Income:40110 - Design Income	1,011,878							
5		40100 - Construction Income:40130 - Labor Income	5,635,423							
6		40100 - Construction Income:40140 - Materials Income	3,225,563							
7		40100 - Construction Income:40150 - Subcontracted Labor Income	2,017,473							
8		40100 - Construction Income:40199 - Less Discounts given	(1,451)							
9		40500 - Reimbursement Income:40520 - Permit Reimbursement Income	36,713							
10		40500 - Reimbursement Income:40530 - Reimbursed Freight & Delivery	26,882							
11			<u>11,952,479</u>	<u>13,000,000</u>						
12										
13		50100 - Cost of Goods Sold	(1,006,290)							
14		54000 - Job Expenses:54200 - Equipment Rental	(9,000)							
15		54000 - Job Expenses:54300 - Job Materials	(2,696,701)							
16		54000 - Job Expenses:54400 - Permits and Licenses	(15,750)							
17		54000 - Job Expenses:54520 - Freight & Delivery	(21,825)							
18		54000 - Job Expenses:54500 - Subcontractors	(1,721,429)							
19		54000 - Job Expenses:54599 - Less Discounts Taken	6,054							
20			<u>(5,464,940)</u>							
21										
22		Gross Margin	<u>6,487,539</u>							
23										
24		60100 - Automobile:60110 - Fuel	(45,212)							
25		60100 - Automobile:60120 - Insurance	(85,507)							
26		60100 - Automobile:60130 - Repairs and Maintenance	(72,180)							
27		60600 - Bank Service Charges	(3,750)							
28		62100 - Insurance:62110 - Disability Insurance	(70,350)							
29		62100 - Insurance:62120 - Liability Insurance	(176,579)							
30		62100 - Insurance:62130 - Work Comp	(373,283)							
31		62400 - Interest Expense:62420 - Loan Interest	(58,892)							
32		62700 - Payroll Expenses:62710 - Gross Wages	(4,049,550)							
33		62700 - Payroll Expenses:62720 - Payroll Taxes	(429,660)							
34		62700 - Payroll Expenses:62730 - FUTA Expense	(9,660)							
35		62700 - Payroll Expenses:62740 - SUTA Expense	(67,350)							
36		63100 - Rent Expense	(382,320)							
37		63600 - Professional Fees:63610 - Accounting	(72,000)							
38		64200 - Repairs:64220 - Computer Repairs	-							
39		64200 - Repairs:64230 - Equipment Repairs	(40,500)							
40		64800 - Tools and Machinery	(60,320)							
41		65100 - Utilities:65110 - Gas and Electric	(31,244)							
42		65100 - Utilities:65120 - Telephone	(25,235)							
43		65100 - Utilities:65130 - Water	(7,920)							
44		69000 - Miscellaneous	(1,650)							
45		70100 - Other Income	3,098							
46		70200 - Interest Income	6,875							
47		Total Fixed Costs	<u>(6,053,190)</u>							
48										
49										
50		TOTAL	<u>434,349</u>	<u>1,000,000</u>						
51										

Plug these assumptions in

Burt's fixed costs are a little more than \$6 million in 2012, but let's say that we can adjust this amount down to \$5,200,000 because the company was able to renegotiate and sign a new lease agreement. The point is that we are using 2012's fixed cost amount along with any known adjustments. This allows us to work backwards to calculate the projected Gross Margin of \$6,200,000.

Using Excel to Detect Fraud

20		(5,464,940)	
21			
22	Gross Margin	6,487,539	6,200,000
23			
24	60100 · Automobile:60110 · Fuel	(45,212)	
25	60100 · Automobile:60120 · Insurance	(85,507)	
26	60100 · Automobile:60130 · Repairs and Maintenance	(72,180)	
27	60600 · Bank Service Charges	(3,750)	
28	62100 · Insurance:62110 · Disability Insurance	(70,350)	
29	62100 · Insurance:62120 · Liability Insurance	(176,579)	
30	62100 · Insurance:62130 · Work Comp	(373,283)	
31	62400 · Interest Expense:62420 · Loan Interest	(58,892)	
32	62700 · Payroll Expenses:62710 · Gross Wages	(4,049,550)	
33	62700 · Payroll Expenses:62720 · Payroll Taxes	(429,600)	
34	62700 · Payroll Expenses:62730 · FUTA Expense	(9,600)	
35	62700 · Payroll Expenses:62740 · SUTA Expense	(67,300)	
36	63100 · Rent Expense	(382,300)	
37	63600 · Professional Fees:63610 · Accounting	(72,000)	
38	64200 · Repairs:64220 · Computer Repairs		
39	64200 · Repairs:64230 · Equipment Repairs	(40,500)	
40	64800 · Tools and Machinery	(60,320)	
41	65100 · Utilities:65110 · Gas and Electric	(31,244)	
42	65100 · Utilities:65120 · Telephone	(25,235)	
43	65100 · Utilities:65130 · Water	(7,920)	
44	69000 · Miscellaneous	(1,650)	
45	70100 · Other Income	3,098	
46	70200 · Interest Income	6,875	
47	Total Fixed Costs	(6,053,190)	5,200,000
48			
49			
50	TOTAL	434,349	1,000,000

From here we can compute **Cost of Goods Sold**, and then divide **Cost of Goods Sold** and **Gross Margin** by **Sales** to derive the desired **Profit Margin** that will cover **Fixed Costs**, **Variable Costs** and still have the desired **Net Income** of \$1,000,000 left over. In conclusion, a **Profit Margin** of 47.7% will yield the desired results.

	A	B	C	D	E	F
1	Burt's Construction Company					
2			<u>Actual 2013</u>	<u>2014??</u>		
3	40100 · Construction Income					
4	40100 · Construction Income:40110 · Design Income		1,011,878			
5	40100 · Construction Income:40130 · Labor Income		5,635,423			
6	40100 · Construction Income:40140 · Materials Income		3,225,563			
7	40100 · Construction Income:40150 · Subcontracted Labor Income		2,017,473			
8	40100 · Construction Income:40199 · Less Discounts given		(1,451)			
9	40500 · Reimbursement Income:40520 · Permit Reimbursement Income		36,713			
10	40500 · Reimbursement Income:40530 · Reimbursed Freight & Delivery		26,882			
11			11,952,479	13,000,000		100.0%
12						
13	50100 · Cost of Goods Sold		(1,006,290)			
14	54000 · Job Expenses:54200 · Equipment Rental		(9,000)			
15	54000 · Job Expenses:54300 · Job Materials		(2,696,701)			
16	54000 · Job Expenses:54400 · Permits and Licenses		(15,750)			
17	54000 · Job Expenses:54520 · Freight & Delivery		(21,825)			
18	54000 · Job Expenses:54500 · Subcontractors		(1,721,429)			
19	54000 · Job Expenses:54599 · Less Discounts Taken		6,054			
20			(5,464,940)	6,800,000		52.3%
21						
22	Gross Margin		6,487,539	6,200,000		47.7%
23						

Now that the optimum profit margin is known, let's say that further analysis reveals that the inventory and labor items on average are priced at just 44.5% above cost, as the following calculations show, net income for 2014 would only be expected to reach \$585,000 – well below Burt's desired profit.

Using Excel to Detect Fraud

	A	B	C	D	E	F
1		Burt's Construction Company				
2			<u>Actual 2013</u>	<u>2014??</u>		
3		40100 · Construction Income				
4		40100 · Construction Income:40110 · Design Income	1,011,878			
5		40100 · Construction Income:40130 · Labor Income	5,635,423			
6		40100 · Construction Income:40140 · Materials Income	3,225,563			
7		40100 · Construction Income:40150 · Subcontracted Labor Income	2,017,473			
8		40100 · Construction Income:40199 · Less Discounts given	(1,451)			
9		40500 · Reimbursement Income:40520 · Permit Reimbursement Income	36,713			
10		40500 · Reimbursement Income:40530 · Reimbursed Freight & Delivery	26,882			
11			<u>11,952,479</u>	<u>13,000,000</u>		100.0%
12						
13		50100 · Cost of Goods Sold	(1,006,290)	(1,328,538)		
14		54000 · Job Expenses:54200 · Equipment Rental	(9,000)	(11,882)		
15		54000 · Job Expenses:54300 · Job Materials	(2,696,701)	(3,560,277)		
16		54000 · Job Expenses:54400 · Permits and Licenses	(15,750)	(20,794)		
17		54000 · Job Expenses:54520 · Freight & Delivery	(21,825)	(28,814)		
18		54000 · Job Expenses:54500 · Subcontractors	(1,721,429)	(2,272,688)		
19		54000 · Job Expenses:54599 · Less Discounts Taken	6,054	7,993		
20			<u>(5,464,940)</u>	<u>7,215,000</u>		55.5%
21						
22		Gross Margin	<u>6,487,539</u>	<u>5,785,000</u>		44.5%
23						
24		60100 · Automobile:60110 · Fuel	(45,212)			
25		60100 · Automobile:60120 · Insurance	(85,507)			
26		60100 · Automobile:60130 · Repairs and Maintenance	(72,180)			
27		60600 · Bank Service Charges	(3,750)			
28		62100 · Insurance:62110 · Disability Insurance	(70,350)			
29		62100 · Insurance:62120 · Liability Insurance	(176,579)			
30		62100 · Insurance:62130 · Work Comp	(373,283)			
31		62400 · Interest Expense:62420 · Loan Interest	(58,892)			
32		62700 · Payroll Expenses:62710 · Gross Wages	(4,049,550)			
33		62700 · Payroll Expenses:62720 · Payroll Taxes	(429,660)			
34		62700 · Payroll Expenses:62730 · FUTA Expense	(9,660)			
35		62700 · Payroll Expenses:62740 · SUTA Expense	(67,350)			
36		63100 · Rent Expense	(382,320)			
37		63600 · Professional Fees:63610 · Accounting	(72,000)			
38		64200 · Repairs:64220 · Computer Repairs	-			
39		64200 · Repairs:64230 · Equipment Repairs	(40,500)			
40		64800 · Tools and Machinery	(60,320)			
41		65100 · Utilities:65110 · Gas and Electric	(31,244)			
42		65100 · Utilities:65120 · Telephone	(25,235)			
43		65100 · Utilities:65130 · Water	(7,920)			
44		69000 · Miscellaneous	(1,650)			
45		70100 · Other Income	3,098			
46		70200 · Interest Income	6,875			
47		Total Fixed Costs	<u>(6,053,190)</u>	<u>5,200,000</u>		
48						
49						
50		TOTAL	<u>434,349</u>	<u>585,000</u>		
51						

At this point, you need to convince Burt of the importance of pricing his products and services at the desired profit margin in an effort to target the desired results. To convey this point, you will tell Burt the following laughable story about the Florida boys who started a business in Gainesville, Florida selling onions. It goes like this:

These two Florida boys were running up to Georgia and buying Vidalia onions at 4 for \$1.00 which they then took back to Gainesville and sold for a quarter a piece on the

streets. The business was an instant success and soon those boys found themselves selling from a road side stand, to a small store, to a much bigger store. The customers kept coming and the business kept getting bigger. Soon they had customers lined up around the block to buy those onions, which they kept buying 4 for a dollar and selling for 25 cents apiece.

After six months, one Florida boy turned to the other and said – “you know, business is great! But I don’t think we’re making any money – what do you think we should do?” The other Florida boy thought real hard and then blurted – “I think we need a bigger truck.”

OK, it’s an old exaggerated story, but there is a lesson to be learned here. If you don’t price your products to make a profit, you will never make a profit. And, ***if you don’t price your products to make your desired profit, you will never make your desired profits***. In our example above, Burt should consider setting his margin pricing to target a profit margin of 47.7%, instead of the current profit margin of 44.5% to ensure a chance of achieving his desired goals. Without this measure, Burt has absolutely no chance of reaching his goals, unless his revenue estimate is wildly under-stated.

To be sure, if Burt’s costs go up or down, his prices will need to be adjusted accordingly to provide the desired profit margin. But when you think about it, this approach is one in which Burt sells his goods and services to his customers at the lowest price point possible that covers his fixed costs, variable costs, and desired profit – and not a penny more. It seems reasonable that every company in the world strive for this goal - right?

Here’s a simplified way to look at this - suppose your business was to purchase candy bars for resell. Your only options are to sell the candy bars for:

- A. *Below cost.*
- B. *At cost.*
- C. *At cost plus your desired profit.*
- D. *At cost plus an egregiously high profit.*
- E. *At cost plus some random profit that may or may not be sufficient.*

I can’t see how any reasonable person could select any option other than C – yet I see many companies sell their products based on all of these scenarios because they don’t take time to calculate their desired profit margin, and then monitor that amount throughout the year.

You can download this Profit margin template at www.CarltonCollins.com/profitmargin.xlsx.

Proof of Cash (Four-Column Bank Reconciliation)

Many auditors use a four-column bank reconciliation, also known as a Proof of Cash, to help shed light on error, misstatements, and fraud. The proof of cash reconciles the bank balance and general ledger over a specified period of time, whereas, the standard bank reconciliation reconciles the two at a specific date. Download the monthly proof of cash template here: www.CarltonCollins.com/5proof.xls.

Proof of Cash				
12/31/2012				
Account Description	Cash - General			
GL Account Number	123456	Prepared By	Jerry Smith	Date
Bank Account Number	000987654321	Reviewed By	Sally Sue	Date
				1/15/2012
				1/18/2012

Description	Beginning Period 12/31/2011	Receipts	Disbursements	End of Period 12/31/2012
Per Bank Statement	12,000.00	25,500.00	17,400.00	20,100.00
Deposits in Transit:				
12/31/2011	2,200.00	(2,200.00)		-
12/31/2012		5,000.00		5,000.00
Outstanding Checks:				
12/31/2011	750.00		750.00	-
12/31/2012			1,500.00	(1,500.00)
Bank Error	-	-	(20.00)	20.00
Other	-	-	-	-
Adjusted Balance	14,950.00	28,300.00	19,630.00	23,620.00
Per General Ledger	14,950.00	28,000.00	19,755.00	23,195.00
Bank Interest		300.00 A		300.00
Bank Charges			50.00 B	(50.00)
NSF Checks			(175.00) C	175.00
Book Error	-	-	-	-
Other	-	-	-	-
Adjusted Balance	14,950.00	28,300.00	19,630.00	23,620.00
Difference	-	-	-	-

Tickmarks	
A	And this is the last tickmark used in the example. Your tickmarks should provide additional information surrounding the adjusting items included in the proof above.
B	Tickmarks not used can be collapsed using the grouping buttons to the left of the row number.
C	The documentation of this item would go here. If your documentation/explanation extends beyond the size of 1 row, as in this example, simply adjust the size of the row.

Purpose of Proof of Cash

The purpose of this report is to test cash transactions for a given period to verify the existence and completeness assertions, as it relates to transactions. This report is frequently used when internal controls over cash transactions are not effective and an audit of the ending cash balance is not enough because of corollary misstatements to other accounts that result from unrecorded cash transactions or fictitious transactions. This report specifically tests for the following four items:

1. Tests that all recorded (on the client's books) cash receipts were actually deposited. (existence)
2. Tests that all receipts deposited in the bank were recorded on the client's books. (completeness)
3. Tests that all recorded cash disbursements were processed by the bank. (existence)
4. Tests that all disbursements processed by the bank were recorded. (completeness)

The standard 4 column proof of cash reconciles client books and records with 3rd party bank records for beginning (column 1) and ending (column 2) balances, as well as cash receipts/deposits (column 2) and cash disbursements/charges (column 3) for a given period. Usually one starts with amounts from the bank statement(s) and reconciles to what is reflected in the client's general ledger and/or cash receipts and disbursements journal, as explained below:

Reconciling Item	Column Affected	Explanation
Beginning Deposits in Transit	1	You must add this amount to the beginning cash balance per bank because the bank did not receive the deposits before the prior month cut off.
Beginning Deposits in Transit	2	You must subtract this amount from the deposits shown by the bank for the period because these were recorded on the client's books in prior period.
Ending Deposits in Transit	2	You must add this amount to the deposits shown by the bank for the period because these were recorded on the client's books this period, but will not be received by the bank until next period.
Ending Deposits in Transit	4	You must add this amount to the ending balance per the bank because the bank did not receive them until after the end of the period, but they were recorded on the client's books this period.
Beginning Outstanding Checks	1	You must subtract this amount from the beginning cash balance per bank because the bank did not

		receive the checks for processing before the prior month cut off.
Beginning Outstanding Checks	3	You must subtract this amount from the disbursements/charges shown by the bank for the period because they were recorded on the client's books in the prior period.
Ending Outstanding Checks	3	You must add this amount to the disbursements/charges shown by the bank for the period because they were recorded on the client's books in this period, but will not be received by the bank for processing until next period.
Ending Outstanding Checks	4	You must subtract this amount from the ending cash balance per bank because the bank did not receive the checks for processing until after this month's cut off, but have been recorded on the client's books.
Customer NSF Checks re-deposited by client in same period	2	You must subtract this amount from deposits per bank because the client did not record the second deposit as an additional receipt.
Customer NSF Checks re-deposited by client in same period	3	You must subtract this amount from disbursements/ charges per bank because the return of the NSF check was not recorded on the client's books as a cash disbursement.
Customer NSF Checks re-deposited by client in the following period	3	You must subtract this amount from disbursements/ charges per bank because the return of the NSF check was not recorded on the client's books as a cash disbursement.
Customer NSF Checks re-deposited by client in the following period	4	You must add this amount to the ending balance per the bank because <ul style="list-style-type: none"> • the bank reduced the balance when the check was returned NSF by the customer's bank and the client did not record it as an additional disbursement and • it is basically a DIT at period's end.

To Prepare a Proof of Cash:

1. Start with a beginning balance, typically a year-end balanced previously reconciled.
2. Reconcile receipts
3. Reconcile disbursements.
4. Complete it with the ending balance, typically the current year-end.

The actual completion of this reconciliation can be relatively complex and time consuming.

Comments About the Proof of Cash Template:

1. Hints are included in comments for each cell (see red triangles in the template)
2. Check figures - each column must foot and cross foot (meaning the columns must balance as well as the rows). Items that don't add up correctly are automatically highlighted.
3. The dates entered at the top of the reconciliation automatically populate the rest of the reconciliation.
4. An example reconciliation has been included on the second worksheet.

Tick marks are included to help document your work.

Excel Data Cleaning

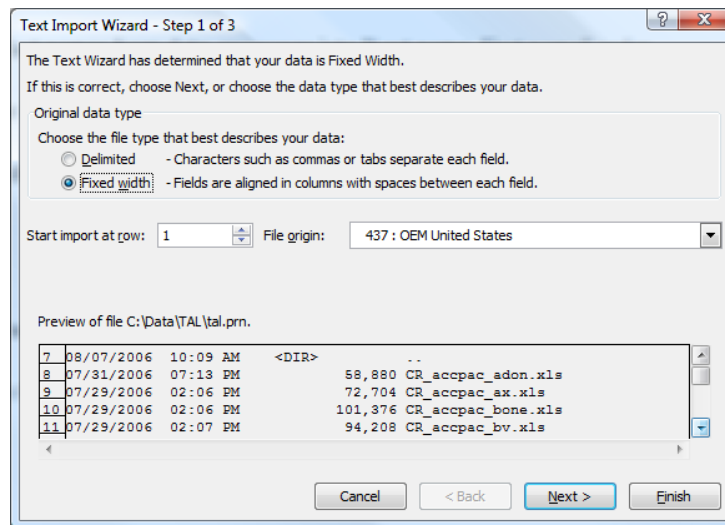
CPAs often receive or retrieve data from many sources in a wide variety of formats such as **Text**, **Comma-Separated-Value** (CSV), or **Web Page** formats. You often cannot have control over the format and type of data that you import. However, before you can analyze the data in Excel, you may need to clean it up first. Fortunately, Office Excel has many features to help you clean data and prepare it for analysis.

By data cleaning, you may think I mean reformatting the data so that the information is more readable and font and font sizes are appropriate, but this is not the kind of data cleaning I am talking about. What I am referring to is the need to separate data in one cell to multiple cells, to repeat row descriptions where needed; add column headings, spell check for spelling errors, remove duplicate rows, remove trailing spaces, eliminate leading zeros, etc. Some of Excel's top functions and commands for cleaning data are as follows:

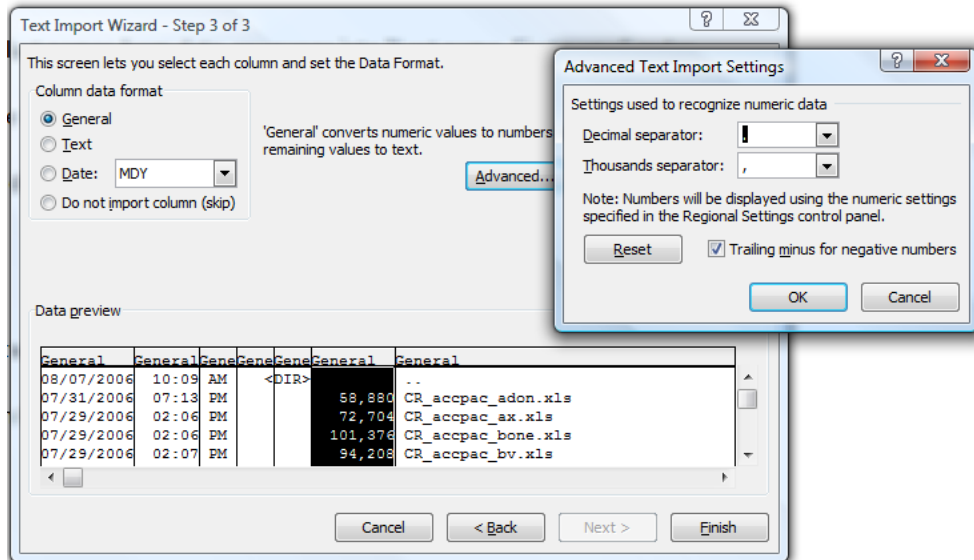
1. Spell checker
2. Import
3. Text to Columns
4. Remove Duplicates
5. Find & Replace
6. Spell Check
7. =UPPER
8. =LOWER
9. =PROPER
10. =FIND
11. =SEARCH
12. =LEN
13. =SUBSTITUTE
14. =REPLACE
15. =LEFT
16. =MID
17. =RIGHT
18. =VALUE
19. =CONCATENATE
20. =TEXT
21. =TRIM
22. =CLEAN
23. =FIXED
24. =DOLLAR
25. =CODE
26. Macro

Data Cleaning Strategies

1. **Importing Data into Excel** – Of course Excel opens Excel files, but what happens when you attempt to open other file formats? The answer is that Excel attempts to automatically import that data on the fly and displays an Import Wizard to help you complete the process. The Text Import Wizard examines the text file that you are importing and helps you import the data the way that you want. To start the Text Import Wizard, on the Data tab, in the Get External Data group, click From Text. Then, in the Import Text File dialog box, double-click the text file that you want to import. The following dialog box will be displayed:

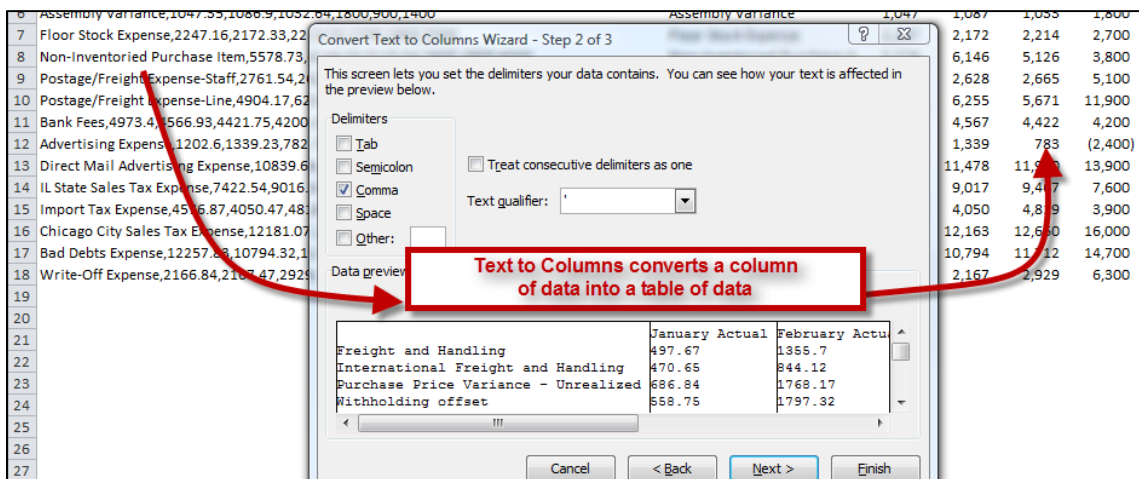


If items in the text file are separated by tabs, colons, semicolons, spaces, or other characters, select **Delimited**. If all of the items in each column are the same length, select **Fixed width**. In step 3, click the **Advanced** button to specify that one or more numeric values may contain a trailing minus sign. Also click the desired data format for each column to be imported.



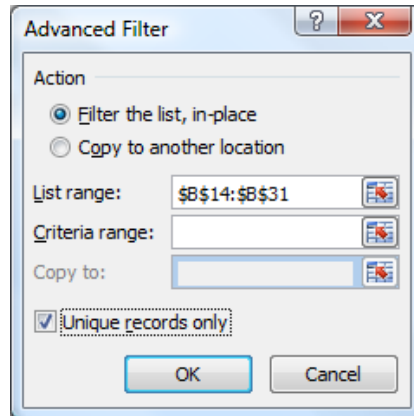
- Text to Columns** – The Text to Columns command located on the Data Ribbon works exactly the same way as described above – the user simply launches it to convert data within an existing worksheet.
- No Built-in Logic Checking** - Excel’s Text to Columns tool does not automatically recognize delimiters (commas, spaces, or quotes), although it may sometimes appear so. Like an elephant, Excel’s Text to Columns simply has a good memory. Each time you use Text to Columns, it remembers your parsing criteria and sets it as the default setting for future parse jobs, until Excel is closed.

Some CPAs use the **Text to Columns** tool, changing the delimiter criteria as necessary, then they open a second file containing the same type of delimited data. In this second case, it may appear to them that Excel automatically recognized the embedded delimiter, but it was only following the lead from the first parsing job.

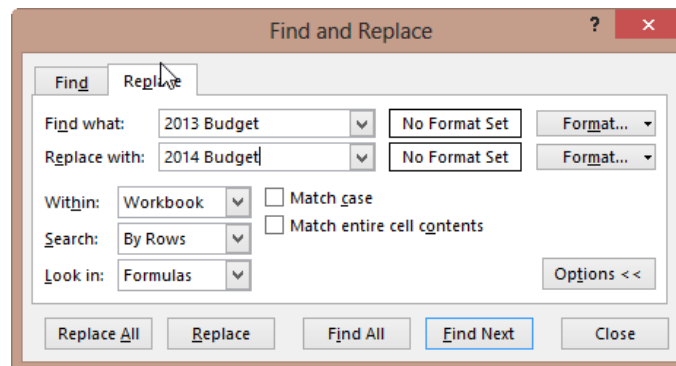


Note: There is no option for changing the default **Text to Columns** delimiter in Excel, but you can achieve the same effect by setting the desired delimiters in a workbook and saving it as a template or as the default workbook. You could also create macros designed to parse data according to the delimiting criteria you frequently encounter.

4. **Removing Duplicate Rows** - Duplicate rows are a common problem when you import data. You can identify and remove duplicate rows by using the **Data, Advanced Filter, Unique Records Only** tool as show in the screen below.



5. **Find and Replace Text** – This tool can be used to identify and remove leading strings, such as a label followed by a colon and space, or a suffix, such as a parenthetic phrase at the end of the string that is obsolete or unnecessary. You can do this by finding instances of that text and then replacing it with no text or other text.



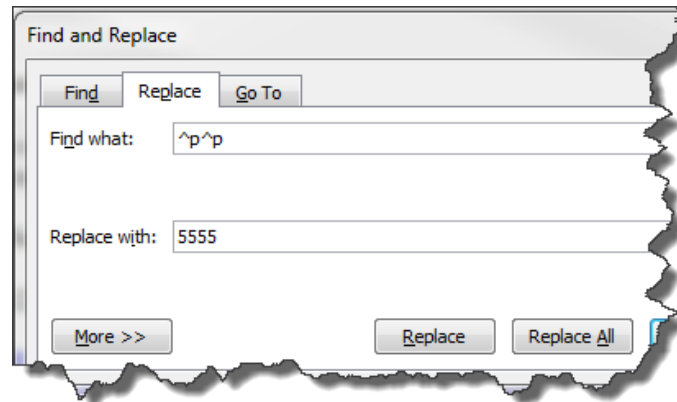
Noteworthy Find and Replace Points:

1. You can find and replace for an entire worksheet, or the entire workbook.
2. You can find and replace formats with new formats.
3. There is a cell chooser option that makes it easier to find and replace formats.
4. If you highlight a range of cells, then **Find and Replace** only finds and replaces within that range of cells.
5. You can replace all at once or one at a time.
6. You could also find and replace references in a formula.

7. Searching for a “[is the only way to locate external links.
6. **Find and Replace in Word, rather than Excel** – In some cases, it may make more sense to first paste your data into Word, and then use the Find and Replace tool in that environment, rather than Excel. This is particularly useful when you are working with row data you want organized into paragraphs.

For example, the easiest way to remove unwanted line breaks is to simply press **Alt + Ctrl + K**. This keystroke combination runs Word’s **AutoFormat** command which analyzes the document and instantly applies an appropriate format, which includes the removal of unnecessary line breaks. (In this case, you should consider adding the **AutoFormat** tool to your **Quick Access Toolbar** for easy access.)

However, depending on the document, **AutoFormat** may delete (or alter) formatting you wanted to keep. In this case, you are on the right track using the search and replace method as you described, you just need to add two small steps to your procedure to obtain the desired results. If you look closely, you will see that your document contains single paragraph breaks where you don’t want them, and double paragraph breaks where you do. The trick is to get rid of the breaks you don’t want but keep the breaks you do. Start by replacing the double paragraph breaks (which you do want to keep) with an uncommon string of text that does not appear in the document, such as “5555”, as follows. From the Office 2010 or 2007 **Home** tab, select **Editing, Replace** to launch the **Find and Replace** dialog box. From the Office 2003 menu select **Edit, Replace** to launch the **Find and Replace** dialog box. Then, in the **Find what** box, type **^p^p**, and in the **Replace with** box type **5555**, as shown.

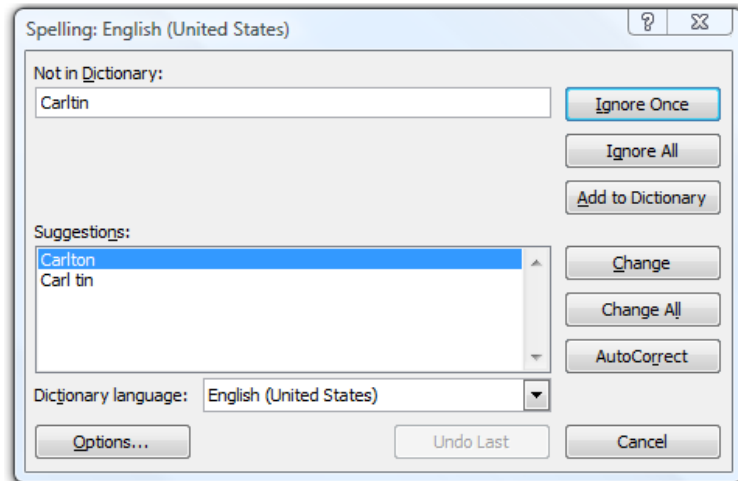


Click the **Replace All** button. Next, use find and replace again to remove all single paragraph breaks (which you don’t want) as follows: From the **Home** tab, select **Editing, Replace** and type **^p** in the **Find what** box and enter a space in the **Replace with** box, then click the **Replace All** button (this action will remove all paragraph breaks from your document and adds spaces instead). Finally, restore the double paragraph breaks as follows: From the **Home** tab, select **Editing, Replace** and type **5555** in the **Find what** box and **^p^p** in the **Replace with** box, then click the **Replace All** button. Your resulting

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document will be devoid of the unwanted paragraph breaks and you will be able to copy, paste and edit the text unencumbered by unwanted line breaks.

- 7. Spell Check** - You can use a spell checker in Excel to not only find misspelled words, but to find values that are not used consistently, such as product or company names, by adding those values to a custom dictionary. The spell check function also checks your grammar as well.



- 8. Changing The Case Of Text** – You can use one or more of the three Case functions to convert text to lowercase letters, such as e-mail addresses; uppercase letters, such as product codes; or proper case, such as names or book titles.

Using a specific case in Excel is not necessary because Excel ignores case for all function calculations (such as VLOOKUPS); however, you may want to convert case for consistency and for better visual appeal and readability.

Excel does utilize case when performing a Search when the Match Case checkbox is selected, or when performing a Sort when the Case Sensitive checkbox is selected.

- a. =UPPER** - Converts text to uppercase letters.

	A	B	C	D	E
13	Keith Bell	118 Belvedere Lane	Peachtree City, GA 30269	770-632-9875	
14					
15	KEITH BELL	118 BELVEDERE LANE	PEACHTREE CITY, GA 30269	770-632-9875	

- b. =LOWER** - Converts all uppercase letters in a text string to lowercase letters.

	A	B	C	D	E
13	KEITH BELL	118 BELVEDERE LANE	PEACHTREE CITY, GA 30269	770-632-9875	
14					
15	keith bell	118 belvedere lane	peachtree city, ga 30269	770-632-9875	

- c. **=PROPER** - Capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. Converts all other letters to lowercase letters.

A15 fx =PROPER(A13)				
	A	B	C	D
13	KEITH BELL	118 BELVEDERE LANE	PEACHTREE CITY, GA 30269	770-632-9875
14				
15	Keith Bell	118 Belvedere Lane	Peachtree City, Ga 30269	770-632-9875

- 9. **Merging And Splitting Columns** - A common task after importing data from an external data source is to either merge two or more columns into one, or split one column into two or more columns. For example, you may want to split a column that contains a full name into a first and last name. Or, you may want to split a column that contains an address field into separate street, city, region, and postal code columns. The reverse may also be true. Presented below are functions that to help you accomplish these tasks:

- 10. **=FIND** – Returns the starting position of a character, string of characters or word with a cell. Find is case sensitive.

I3 fx =FIND("(",A3)										
	A	B	C	D	E	F	G	H	I	
3	Alan Akers,316 Wild Heron Road,St. Simons Island, GA 31522,(912) 638-5009,alan@akers.com									60

- 11. **=SEARCH** – Returns the starting position of a character, string of characters or word with a cell. Search is not case sensitive.

I3 fx =SEARCH("(",A3)										
	A	B	C	D	E	F	G	H	I	
3	Alan Akers,316 Wild Heron Road,St. Simons Island, GA 31522,(912) 638-5009,alan@akers.com									60

- 12. **=LEN** – Displays the length or number of characters in a cell.

B3 fx =LEN(A3)	
	A
3	Alan Akers,(912) 638-5009,alan@Yahoo.com, alan@Gmail.com,AlanAkers@SSI.com
	74

- 13. **=SUBSTITUTE** – Replaces a character or characters with a character or characters that you specify.

A8 fx =SUBSTITUTE(A6,"AOL","America Online")	
	A
6	Teresa Baldwin, (912) 265-2616, Teresa@AOL.com
7	
8	Teresa Baldwin, (912) 265-2616, Teresa@America Online.com

- 14. **=REPLACE** - Replaces a character positions with a character or characters that you specify.

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A8		fx =REPLACE(A6,40,3,"America Online")	
		A	
6	Teresa Baldwin, (912) 265-2616, Teresa@AOL.com		
7			
8	Teresa Baldwin, (912) 265-2616, Teresa@America Online.com		

15. **=LEFT** – Extracts the specified number of characters from a cell, starting from the left.

H4		fx =LEFT(G4,7)	
		G	H
4	Memphis, TN (Briarcrest Christina HS)	Memphis	

16. **=MID** – Extracts the specified number of characters from a cell, starting from somewhere in the middle of the cell.

H4		fx =MID(G4,10,2)	
		G	H
4	Memphis, TN (Briarcrest Christina HS)		TN

17. **=RIGHT** – Extracts the specified number of characters from a cell, starting from the right.

F4		fx =RIGHT(G4,3)		
		F	G	H
4	268	6-5/268	Memphis, TN (Briarcrest Christina HS)	

18. **=Value** – Converts text to values so the data can be added, subtracted, multiplied, divided or referenced in a function.

F4		fx =VALUE(RIGHT(G4,3))				
		D	E	F	G	H
4	Fr.	HS	268	6-5/268	Memphis, TN (Briarcrest Christina HS)	

19. **=CONCATENATE** - Joins two or more text strings into one text string.

C1		fx =A1&" "&B1				
		A	B	C	D	E
1	Carlton	Collins	Carlton	Collins		
2						

Just to make you aware, Excel provides the following variations of these functions for use when working with foreign languages or foreign characters like these (京", "東京都)
=FINDB; =SEARCHB; =REPLACEB; =LEFTB; =RIGHTB; =LENB; and =MIDB.

Cleaning Text – (Removing Spaces And Nonprinting Characters From Text) - Sometimes text values contain leading, trailing, or multiple embedded space characters (character set values 32 and 160), or nonprinting characters (Unicode character set values 0 to 31, 127, 129, 141, 143, 144, and 157). These characters can sometimes cause unexpected results when you sort, filter, or search. For example, in the external data source, users may make typographical errors by inadvertently adding extra space characters, or imported text data from external sources may contain nonprinting characters that are embedded in the text. Because these characters are not easily noticed, the unexpected results may be difficult to understand. Following is a list of functions you can use to remove these unwanted characters:

20. =TEXT - Converts a value to text in a specific number format.

A10 fx =A5&" sold "&TEXT(B5, "\$0.00")&" worth of units."			
	A	B	
5	Carlton Collins	\$ 2,800.00	Mo
6	Mickey Mouse	40%	
7			
8	Examples		
9	Carlton Collins2800		Simple com
10	Carlton Collins sold \$2800.00		Combines c

21. =TRIM - Removes the 7-bit ASCII space character (value 32) from text.

C4 fx =TRIM(B4)		
	B	C
4	American Institute of Certified Public Accountants	American Institute of Certified Public Accountants

22. =CLEAN - Removes the first 32 nonprinting characters in the 7-bit ASCII code (values 0 through 31) from text.

D4 fx =CLEAN(B4)			
	A	B	D
4		•Accounts Receivable•	Accounts Receivable

23. =FIXED - Rounds a number to the specified number of decimals, formats the number in decimal format by using a period and commas, and returns the result.

B15 fx =FIXED(B13,2)				
	A	B	C	D
13	Insurance	11,826.9537	15,375.0398	19,218.7997
14				
15		11,826.95	15,375.04	19,218.80

24. =DOLLAR - Converts a number to text format and applies a currency symbol.

B15		fx =DOLLAR(B13,2)		
	A	B	C	D
13	Insurance	11,826.9537	15,375.0398	19,218.7997
14				
15		\$11,826.95	\$15,375.04	\$19,218.80

25. =CODE - Returns a numeric code for the first character in a text string.

Fixing Dates and Times - There are many different date formats, and these varied formats may be confused with numbered part codes or other strings that contain slash marks or hyphens. Dates and times often need to be converted and reformatted. Presented below is a list of functions that help you accomplish this task.

26. =DATE - Returns the sequential serial number that represents a particular date. If the cell format was set to **General** before the function was entered, the result is formatted as a date.

A7		fx =DATE(A4,B4,C4)				
	A	B	C	D	E	F
3	Year	Month	Day	Data		
4	2008	1	1	20081125		
5						
6	Examples:					
7	1/1/2008			Serial date for the date derived by using cells A2, B2, and C2 as t		

27. =DATEVALUE - Converts a date represented by text to a serial number.

C4		fx =DATEVALUE(A4)			
	A	B	C	D	E
4	1/1/2008		39448		

28. =TIME - Returns the decimal number for a particular time. If the cell format was set to **General** before the function was entered, the result is formatted as a date.

29. =TIMEVALUE - Returns the decimal number of the time represented by a text string. The decimal number is a value ranging from 0 (zero) to 0.99999999, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.).

Transforming And Rearranging Columns And Rows - Most of the analysis and formatting features in Office Excel assume that the data exists in a single, flat two-dimensional table. Sometimes you may want to make the rows become columns, and the columns become rows. At other times, data is not even structured in a tabular format, and you need a way to transform the data from a nontabular to a tabular format. The following function can help you achieve this goal:

30. =TRANSPOSE - Returns a vertical range of cells as a horizontal range, or vice versa.

SUM X ✓ f =TRANSPOSE(A2:FC18)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	=Transpose (You must select a range, Press F2, and then press CTRL+SHFT+ENTER)																				
2	Name	My Area is:	Public Practice	Industry	Government	Education	Other 1:	I am a CPA	My Position is:	Owner or Partner	Manager	Supervisor	Senior or staff	Administrative	Other 2	My Experience is:	0-5 years	6-10 years	11-20 years	21 - 30 Years	More than 30 years
3	Heydon		1							1											1
4	Forsberg			1				1					1						1		
5	Morris		1						1	1											1
6	Olson			1					1	1											1
7	Morlock		1						1	1											1
8	Sheehan		1						1	1											1
9	Adank						1	1						1							1
10	Hage		1					1													1
11	Bartholomay			1						1											1
12	Myers			1						1											1
13	Dickson		1									1									1
14	Hillstrom		1										1				1				
15	Marshman		1					1			1								1		
16	Stroud		1					1	1												1
17	Chilcote		1					1					1						1		
18	DeMars		1									1				1					
19																					
20	=TRANSPOSE(A2:FC18)																				

31. **Data Fill In Trick** – A clever trick for filling in missing data can be accomplished using the GOTO, Special, Blanks command. Here is how it works. This trick works well when you have a large volume of data but descriptions are not provided for every row, as shown in the example below:



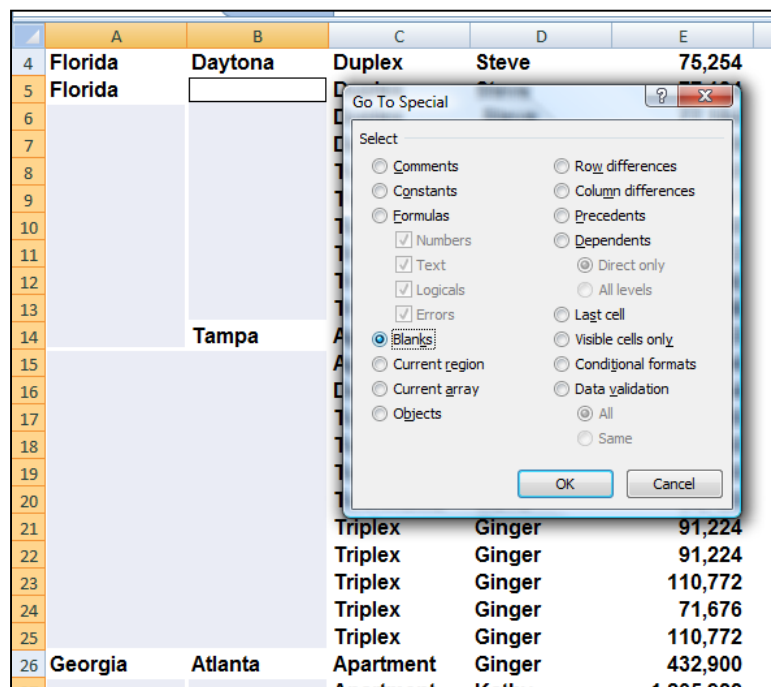
	A	B	C	D	E	F	G	H
26	Georgia	Atlanta	Apartment	Ginger	432,900	367,965	64,935	24.7%
27			Apartment	Kathy	1,205,988	1,073,329	132,659	43.2%
28			Apartment	Ginger	96,768	70,641	26,127	53.3%
29			Apartment	Kathy	328,563	305,564	22,999	39.8%
30			Duplex	Steve	57,888	55,572	2,316	31.5%
31			Duplex	Steve	79,114	64,873	14,240	27.6%
32			Duplex	Steve	57,888	55,572	2,316	18.7%
33			Duplex	Steve	79,114	64,873	14,240	54.4%
34			Townhome	Steve	39,600	38,016	1,584	56.4%
35			Townhome	Steve	51,480	58,172	(6,692)	26.5%
36			Triplex	Ginger	181,988	205,646	(23,658)	43.2%
37			Triplex	Steve	71,676	70,959	717	53.3%
38			Triplex	Ginger	121,198	112,714	8,484	15.4%
39		Macon	Apartment	Ginger	128,563	119,564	8,999	15.4%
40			Apartment	Steve	296,700	216,591	80,109	23.3%
41			Apartment	Ginger	128,563	119,564	8,999	13.4%
42			Duplex	Steve	76,219	60,213	16,006	26.5%
43			Duplex	Steve	75,254	58,698	16,556	35.6%
44			Townhome	Steve	52,800	46,992	5,808	18.7%
45		Savannah	Apartment	Ginger	76,032	75,272	760	65.0%
46	Texas	Dallas	Apartment	Fred	432,900	367,965	64,935	24.7%
47			Apartment	Martha	1,205,988	1,073,329	132,659	43.2%
48			Apartment	Kathy	328,563	305,564	22,999	39.8%
49			Duplex	Steve	57,888	55,572	2,316	31.5%

Start by entering a simple formula referencing the data label in the above cell, just like this:

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	A	B	C	D	E	F
3	State	City	Type	Manager	Revenue	Expenses
4	Florida	Daytona	Duplex	Steve	75,254	58,698
5	=A4		Duplex	Steve	77,184	87,218

- Next copy that formula...
- Highlight the entire range containing data labels in columns A and B. columns...
- Press the F5 key to launch the GoTo dialog box...
- Select the Options Box...
- Click on the "Blanks" radio button...
- Press Enter...
- Paste.



This action will cause all data labels to repeat in the empty cells beneath. Next:

- Copy columns A & B...
- Paste Special as values to convert the formulas to text based data labels...
- You are now ready to sort, filter, subtotal and pivot your data.

Fetching Data - Occasionally, database administrators use Office Excel to find and correct matching errors when two or more tables are joined. This might involve reconciling two tables from different worksheets, for example, to see all records in both tables or to compare tables and find rows that don't match.

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32. **=VLOOKUP** - Searches for a value in the first column of a table array and returns a value in the same row from another column in the table array. For example, consider the example below which uses a =VLOOKUP function to calculate the appropriate amount of tax due based on the IRS rate schedule.

Schedule Y-1 — Married Filing Jointly or Qualifying					
If Taxable Income	But Not Over--	The Tax Is:	Base Tax	Tax Rate	
\$0	\$14,600	over \$0	-	10%	
\$14,600	\$59,400	15% of the amount	1,460.00	15%	
\$59,400	\$119,950	the amount over	8,180.00	25%	
\$119,950	\$182,800	28% of the amount	23,317.50	28%	
\$182,800	\$326,450	33% of the amount	40,915.50	33%	
\$326,450	no limit	35% of the amount	88,320.00	35%	

1	=VLOOKUP				
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13	Taxable Income (from profit & loss statement on Sheet 2)				224,209
14	Taxable Income Threshold Amount (from Column 1 Above)			182,800.00	
15					
16	Tax Rate (from Column 5 Above)				33%
17					
18	Base Tax Amount (from Column 4 Above)				40,915.50
19					
20	Total Amount of Taxes Due				54,580.47
21					
22					

Income Statement - Schedule C		2009
Revenue		
Sales		\$ 2,300,322
Cost of Goods Sold		1,546,577
Gross Margin		\$ 753,745
Expenses:		
Rent	\$	86,230
Salaries		326,300
Supplies		12,988
Insurance		36,788
Travel		67,230
Total Expenses		\$ 529,536
Net Income Before Taxes		\$ 224,209
Taxes		\$ 54,580
Net Income After Taxes		\$ 169,629

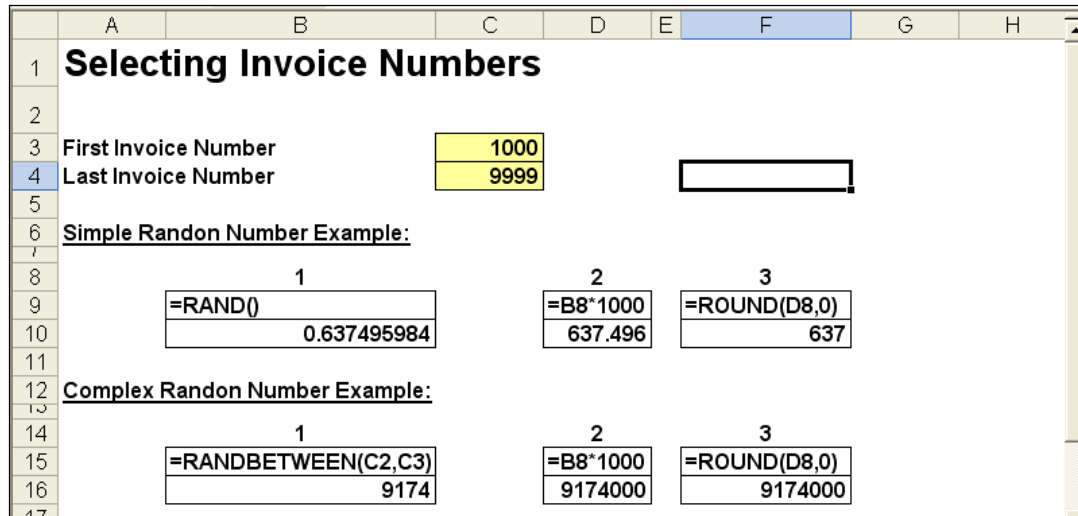
As the Income statement shown in the shaded area is updated, the resulting taxable income amount is referenced in Cell F13. Next, 3 VLOOKUP functions pull the appropriate rate, base and threshold information from the rate schedule to be used in calculating income tax. Once calculated, the resulting tax is referenced back to the income statement for the purposes of computing Net income after taxes.

Key points to Consider when Using VLOOKUP:

- If you are looking up based on text, the first column containing lookup values must be sorted alphabetically in descending order – else it will not work properly.
- Another approach is to add the FALSE attribute at the end of the VLOOKUP function, to force Excel to lookup values based on exact matches.
- If you are looking up based on text, you must have an exact match between the lookup value and the table array value.
- If you are looking up based on values, the first column containing lookup values must be sorted numerically in descending order – else it will not work properly.
- If you are looking up based on values, then Excel will choose the closest value without going over. For example, if the lookup value is 198,000 and the table array contains values of 100,000 and 200,000, then Excel will choose 100,000 because 200,000 goes over or exceeds 198,000. (It might be helpful to think back to the old Bob Barker game show the Price is Right.)



- 33. =HLOOKUP** - Searches for a value in the top row of a table or an array of values, and then returns a value in the same column from a row you specify in the table or array.
- 34. =INDEX** - Returns a value or the reference to a value from within a table or range. There are two forms of the INDEX function: the array form and the reference form.
- 35. =MATCH** - Returns the relative position of an item in an array that matches a specified value in a specified order. Use MATCH instead of one of the LOOKUP functions when you need the position of an item in a range instead of the item itself.
- 36. =OFFSET** - Returns a reference to a range that is a specified number of rows and columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned.
- 37. Data Cleaning with Macros** - To periodically clean the same data source, consider recording a macro or writing code to automate the entire process. There are also a number of external add-ins written by third-party vendors, listed in the Third-party providers section, that you can consider using if you don't have the time or resources to automate the process on your own.
- 38. RAND(), RANDBETWEEN(), ROUND()** – In Excel 2003, RANDBETWEEN is not in the standard EXCEL 2003 installation but if the analysis tool pack is installed and the add-in activated it is an extremely useful function.



39. Informational Functions

CELL(info_type,reference) - Info_type is a text value that specifies what type of cell information you want. The following list shows the possible values of info_type and the corresponding results.

Info_type	Returns
"address"	Reference of the first cell in reference, as text.
"col"	Column number of the cell in reference.
"color"	1 if the cell is formatted in color for negative values; otherwise returns 0 (zero).
"contents"	Value of the upper-left cell in reference; not a formula.
"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved.
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "(" at the end of the text value if the cell is formatted with parentheses for positive or all values.
"parentheses"	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0.
"prefix"	Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text, double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains

	centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else.
"protect"	0 if the cell is not locked, and 1 if the cell is locked.
"row"	Row number of the cell in reference.
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.
"width"	Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

Reference the cell that you want information about. If omitted, information specified in info_type is returned for the last cell that was changed. The following list describes the text values CELL returns when info_type is "format", and reference is a cell formatted with a built-in number format.

If the Microsoft Excel format is	CELL returns
General	"G"
0	"F0"
#,##0	","0"
0.00	"F2"
#,##0.00	","2"
[\$,##0_);(\$,##0)	"C0"
[\$,##0_);[Red](\$,##0)	"C0-"
[\$,##0.00_);(\$,##0.00)	"C2"
[\$,##0.00_);[Red](\$,##0.00)	"C2-"
0%	"P0"
0.00%	"P2"
0.00E+00	"S2"
# ??/? or # ??/??	"G"
m/d/yy or m/d/yy h:mm or mm/dd/yy	"D4"
d-mmm-yy or dd-mmm-yy	"D1"

d-mmm or dd-mmm	"D2"
mmm-yy	"D3"
mm/dd	"D5"
h:mm AM/PM	"D7"
h:mm:ss AM/PM	"D6"
h:mm	"D9"
h:mm:ss	"D8"

If the info type argument in the CELL formula is "format", and if the cell is formatted later with a custom format, then you must recalculate the worksheet to update the CELL formula.

<u>Examples of Cell Information</u>	
44	=CELL("col",B5)
	=CELL("format",B5)
	=CELL("width",B6)
	=CELL("address",B5)

Third-Party Solutions – In case Excel’s built in functions are not sufficient to meet your needs, following is a partial list of third-party providers that have products that are used to clean data in a variety of ways.

Provider	Product
Add-in Express Ltd.	Advanced Find & Replace, Merge Cells Wizard
Add-Ins.com	Duplicate Finder
AddinTools	AddinTools Assist
CDX	Zip Stream
Click 2 Convert	Converts PDF to Excel formats
DigDB	Add-ins for Excel®
JKP Application Development	Flexfind for Excel
J-Walk & Associates, Inc.	Power Utility Pak Version 7
Office Assistance LLC	Similar Data Finder for Excel®
PATools	PATools Advanced Find Replace
PDF2XL	Converts PDF files to Excel Formats
Spinnaker Software Solutions	Spinnaker DB tools for Excel
Vonnix	Excel Power Expander 4.6
WinPure	ListCleaner Lite
ListCleaner Pro	
Clean and Match 2007	

Data Cleaning Case Study - Preparing QuickBooks Data

When it comes to pivoting QuickBooks data in Excel, you must first do a little bit of clean up work before pivoting process can begin. In the following example, I have exported a QuickBooks general ledger report from 1995 to 2011, and I walk you through the process of preparing the expense portion of this data for pivoting, as follows.

1. **Remove Empty Columns** – QuickBooks provides an option for exporting a general ledger report to Excel without empty columns, but this is not the default action. If you have not adjusted this default setting, then your exported general ledger report will contain empty columns, and you should remove them by selecting an empty column, right clicking on that column, and selecting Delete Column. Thereafter, you can select each subsequent empty column and press the F4 key to repeat the deletion.
2. **Reformat Text Columns** – QuickBooks does a nasty thing when it exports data to Excel in that it formats all text columns with text formatting, making it impossible to insert text based formulas, (which we want to do in the next step). To correct this problem, select the text columns and from the **Home** tab, select **General** from the **Number Format** drop down options box in the **Number** group.
3. **Delete the Non Expense Related Rows** – In this example, the expense related rows begin on row 9490, therefore I will delete everything above that row, except the top row column headings. Select these rows by clicking on row 9408 (not visible in screen shot), then hold the **Shift Key** down and press **HOME**, then move down one row, right-click on the selected range and select **DELETE**. The data should now appear as follows:

	A	B	C	D	E	F	G	H
			Type	Date	NumAdj		Name	Memo
1								
2		Advertising - Business						
3			Check	03/07/1996	6164		Foster & Associates	Portrait for Brochure
4			Check	03/27/1996	6175		Foster & Associates	Portrait for Brochure
5			Check	04/11/1997	6338		Foster & Associates	Portrait for Brochure
6			Check	04/29/1997	6347		M-Broidery, Inc.	K2 Shirts for Vendors
7		Total Advertising - Business						
8		Airgrd						
9			Check	06/08/2004	4521		Bank One	Quiktrip Gasoline
10		Total Airgrd						
11		Asset Purchases - Business						
12			Check	01/15/1995	5969		American Express	-MULTIPLE-
13			Check	01/15/1995	5969		American Express	Home Depot Credit

4. **Insert Column Descriptions** – In this example, there is no column description in Columns A & B, therefore we need to insert descriptions – any description will do.
5. **Repeat Account Description** – In column B, the **Account Description** must be repeated on all subsequent blank rows below. For example, the phrase Advertising – Business shown on 2 in the screen image above needs to be repeated on rows 3, 4, 5, and 6. To do this:
 - a. In cell B3, enter the formula =B2.
 - b. Copy cell B3 by pressing **Ctrl + C**.

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- c. Highlight the range from **B2** to the end of column B's data range, **B8816** in this example.
- d. Press the **F5** key to launch the **GoTo** dialog box.
- e. Click the **Special** button, check the radio button labeled **Blanks**, then click **OK**.
- f. Paste the data by pressing **Ctrl + V**.
- g. Next, select Column B and copy the entire column by pressing **Ctrl + C**.
- h. Select **Home** tab, **Paste Special**, **Paste Values**. (Note that without this extra step, you will end up with formulas, and not values throughout column B, which will not be suitable for Pivoting.)

	B	C	D	E	F	G	H
1	Account Description	Type	Date	NumAdj		Name	Memo
2	Advertising - Business						
3	Advertising - Business	Check	03/07/1996	6164		Foster & Associates	Portrait for Brochure
4	Advertising - Business	Check	03/27/1996	6175		Foster & Associates	Portrait for Brochure
5	Advertising - Business	Check	04/11/1997	6338		Foster & Associates	Portrait for Brochure
6	Advertising - Business	Check	04/23/1997	6347		M-Broidery, Inc.	Shirts for Vendors
7	Total Advertising - Business						
8	Airgrd						
9	Advertising - Business	Check	06/08/2004	4521		Bank One	Quiktrip Gasoline
10	Total Airgrd						
11	Asset Purchases - Business						
12	Advertising - Business	Check	01/15/1995	5969		American Express	-MULTIPLE-
13	Advertising - Business	Check	01/15/1995	5969		American Express	Home Depot Credit

6. **Save Your Work** – At this point, save your work (and save it often), perhaps to a new file name (such as Export 2), in case power goes out or a major mistake is made.
7. **Number Each Row** – Insert a new column in front of Column A, and number them sequentially. To insert numbers quickly, enter the number 1 in cell **A1** and the number 2 in cell **A2**. Now highlight cells **A1:A2**, and doubleclick the Fill handle. This action will automatically number your rows down to row 8,816.

8810	8810	Water -- Personal	Check	12/14/2011	6357	Gwinnett
8811	8811	Water -- Personal	Check	01/09/2012	6374	Gwinnett
8812	8812	Water -- Personal	Check	02/03/2012	6391	Gwinnett
8813	8813	Total Water -- Personal				
8814	8814	No acct				
8815	8815	Total no acct				
8816	8816	TOT/ Total no acct				

8. **Eliminate Non Transaction Rows** – The data's transaction rows each contain a date, therefore sort the data by the date column, then delete all rows that do not have dates, then resort the data by column A in descending order.

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	A	B	C	D	E	F	G	H
1	1	Row	Account Description	Type	Date	Num	Name	Memo
2	3		Advertising - Business	Check	03/07/1996	6164	Foster & Associates	Portrait for Brochure
3	4		Advertising - Business	Check	03/27/1996	6175	Foster & Associates	Portrait for Brochure
4	5		Advertising - Business	Check	04/11/1997	6338	Foster & Associates	Portrait for Brochure
5	6		Advertising - Business	Check	04/29/1997	6347	M-Broidery, Inc.	Shirts for Vendors
6	9		Airgrd	Check	06/08/2004	4521	Bank One	Quiktrip Gasoline
7	12		Asset Purchases - Business	Check	01/15/1995	5969	American Express	-MULTIPLE-
8	13		Asset Purchases - Business	Check	01/15/1995	5969	American Express	Home Depot Credit
9	14		Asset Purchases - Business	Check	02/03/1995	5980	American Express	-MULTIPLE-
10	15		Asset Purchases - Business	Check	03/21/1995	6032	American Express	-MULTIPLE-
11	16		Asset Purchases - Business	Check	03/21/1995	6032	American Express	Home Depot

9. **Delete Columns A & B** – Delete columns A & B As they are no longer needed.

10. **Format the Data** – To make the data visually easier to read, format the data to your desired appearance. For example, I changed all fonts to Calibri and all font colors to black; I removed unnecessary borders and lines; I bolded the column heading labels only; I adjusted column widths; and I centered certain text columns. My data now appears as follows:

	A	B	C	D	E	F
1	Account Description	Type	Date	Num	Name	Memo
2	Advertising - Business	Check	03/07/1996	6164	Foster & Associates	Portrait for Brochure
3	Advertising - Business	Check	03/27/1996	6175	Foster & Associates	Portrait for Brochure
4	Advertising - Business	Check	04/11/1997	6338	Foster & Associates	Portrait for Brochure
5	Advertising - Business	Check	04/29/1997	6347	M-Broidery, Inc.	Shirts for Vendors
6	Airgrd	Check	06/08/2004	4521	Bank One	Quiktrip Gasoline
7	Asset Purchases - Business	Check	01/15/1995	5969	American Express	-MULTIPLE-
8	Asset Purchases - Business	Check	01/15/1995	5969	American Express	Home Depot Credit
9	Asset Purchases - Business	Check	02/03/1995	5980	American Express	-MULTIPLE-
10	Asset Purchases - Business	Check	03/21/1995	6032	American Express	-MULTIPLE-
11	Asset Purchases - Business	Check	03/21/1995	6032	American Express	Home Depot
12	Asset Purchases - Business	Check	03/21/1995	6033	ATT Universal Card	Target
13	Asset Purchases - Business	Check	04/25/1995	6040	American Express	Luggage for Computer
14	Asset Purchases - Business	Check	05/10/1995	6046	AT & T Universal Card	Walmart
15	Asset Purchases - Business	Check	06/25/1995	6060	American Express	Service Merchandise

11. **Tidy the Debits and Credits Columns** – The presentation of the debits and credits columns are not conducive to easy pivoting, therefore I inserted the formula to combine debits and credits in the same column as shown below.

	G	H	I	J	K
1	Split	Debit	Credit	Balance	
2	Wachovia Checking	174.90		174.90	=H2-I2
3	Wachovia Checking	84.50		259.40	84.50
4	Wachovia Checking	80.42		339.82	80.42
5	Wachovia Checking	370.50		710.32	370.50
6	First Union Checking	32.94		32.94	32.94
7	Wachovia Checking	795.33		795.33	795.33
8	Wachovia Checking		55.47	739.86	(55.47)
9	Wachovia Checking	489.02		1,228.88	489.02
10	Wachovia Checking	310.53		1,539.41	310.53

Next I converted the formulas contained in Column K to values using the same steps mentioned above (in steps 5g & 5h), labeled Column K, then deleted Columns H, I and J as they are no longer needed. My data now appears as follows:

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	E	F	G	H
1	Name	Memo	Split	Amount
2	Foster & Associates	Portrait for Brochure	Wachovia Checking	174.90
3	Foster & Associates	Portrait for Brochure	Wachovia Checking	84.50
4	Foster & Associates	Portrait for Brochure	Wachovia Checking	80.42
5	M-Broidery, Inc.	Shirts for Vendors	Wachovia Checking	370.50
6	Bank One	Quiktrip Gasoline	First Union Checking	32.94
7	American Express	-MULTIPLE-	Wachovia Checking	795.33
8	American Express	Home Depot Credit	Wachovia Checking	(55.47)
9	American Express	-MULTIPLE-	Wachovia Checking	489.02
10	American Express	-MULTIPLE-	Wachovia Checking	310.53

12. **Data Review and More Cleaning** – Now that the data has been cleaned from a layout point of view, it still must be reviewed for consistency in content as well. For example, in this data set we can see many problems as follows:

- a. **Consistency** – A quick review reveals that consistent account descriptions and memos have not been used throughout the data. For example, as shown below the phrase AT&T Universal Card has not been entered consistently. If you plan to summarize data using this phrase, then consistent phrasology is needed throughout.

ATT Universal Card American Express AT & T Universal Card

- b. **No Amounts** - Some transactions have no amounts, which may be due to Voided transactions or other explanations. Each of these transactions should be reviewed to determine if that line item should be removed completely.
- c. **Credit Amounts** – Some transactions have credit balances, which aren't expenses at all. Each of these transactions should be reviewed to ensure the data is a valid expense, and if not, consideration should be given to removing the transaction completely.

13. **Ready for Pivoting** – At this point, the data is ready for pivoting. As an example, the PivotTable report shown below was created in only a few seconds, including time to adjust the grouping of the dates listed across the report in Years.

Looking for Fraud

Looking for Fraud in Accounts Payable

According to a report to the Nation on Occupational Fraud and Abuse by the Association of Certified Fraud Examiners, losses to fraud in the average company amount to a staggering 6 percent of gross sales. Roughly 45 percent of all fraud involves asset misappropriations of cash in an accounts payable related transaction with an additional 13 percent related to bribery or corruption. This means that 58 percent of 6 percent, or as much as 3.5 percent of gross sales, are lost in this one functional area. Many companies struggle along with profit rates much lower than 3.5 percent! Furthermore, a majority of these misappropriations represent fraudulent vendors, check tampering, and fraudulent expense reimbursements—items that proper controls ought to deal with. It has also been found that companies completing internal or external fraud examinations can reduce their median losses from \$153,000 to \$87,000 or over 40 percent.

Based on these statistics, if a company earns \$250 million in sales, they lose an average of 6 percent to fraud from all causes (\$15 million) of which roughly 45 percent involves misappropriation of accounts payable (\$6.8 million). Of this sum, 40 percent might be saved through internal auditing (\$2.7 million). Bottom line, if you can clean up fraud within your accounts payable area, you can make an enormous difference.

1. **Above Average Payments to a Vendor** - Calculate vendor invoice averages, to locate all invoice amounts exceeding more than twice the vendor's average. Then scrutinize all vendor payments that exceed twice the average. Use the **AVERAGE** function and then conditional formatting.
2. **Employee to Vendor Address Match** - Compare the street address for vendors and employees to see if there are any matches. Look for exact matches and then look for a partial match. Use the **IF**, **MATCH** or **VLOOKUP** functions, along with the **LEFT**, **MID** or **RIGHT** functions.
3. **Duplicate Payments** - Duplicate payments are sometimes converted to the use of an employee. The employee may notice the duplicate payment, then he or she may prepare a phony endorsement of the check.

Looking for Fraud in Revenue

Accounts receivable, and the revenue streams that drive it, is arguably the most risky part of a financial statement audit. Any restatement, due to error or fraud, has the potential to bankrupt an organization. According to one study, cash misappropriation fraud (*when people who are entrusted to manage an organization's assets steal those assets*) accounts for 30% of all fraud.

Management is under pressure every day to meet sales and associated income targets. Stock price, management compensation, and analyst/media commitments exacerbate this pressure, so much so that it can persuade management to misstate earnings. Although such misstatements may start as a laissez-faire reading of Generally Accepted Accounting Principles, they tend to snowball into larger and larger entries until they become outright fraud.

A 10-year study commissioned by the Committee of Sponsoring Organizations of the Treadway Commission concluded that more than half of frauds involved overstating revenue. This is corroborated by the Association of Certified Fraud Examiner's report to the Nation on Occupational Fraud and Abuse. If the business model is sound and industry conditions do not pose a threat, there is nothing for management to feel pressured about. Unfortunately, business models are not realized as they are envisioned and the industry may be highly impacted due to change and competition. Management will be the primary identifiers of these trends but may not be compelled to explain such vulnerabilities with investors or creditors. Thus, it is imperative for the fraud examiner to not only understand the business and industry conditions, but also to utilize computer assisted tools to identify trends underlying the financial reports.

Aside from financial statement fraud explained above, there are three major types of fraud in the accounts receivable/revenue area:

- Skimming, in which cash is stolen from an organization before it is recorded on the organization's books and records.
 - Cash larceny, in which cash is stolen from an organization after it has been recorded on the organization's books and records.
 - Fraudulent shipments made to employee locations.
4. **Missing / Unusual Customer Information** - Analyze the Customer records to see if there is missing information. Perhaps use the **IF** function to pinpoint cells with no data.
 5. **Uncollected A/R Accounts** – Scrutinize all uncollected or severely delinquent A/R balances, and investigate whether these are legitimate customers. If not, search audit trail records to determine who set the customer up in the system. Use the **SORT** commands or **LARGE** function to extract transactions with the highest number of days outstanding.
 6. **Excessive Credit Memos** - Similar to excessive voids, this technique can be used to cover the theft of cash. A credit memo to a phony customer is written out, and the cash is taken to make the total cash balance.
 7. **Write-off of Accounts Receivable** - Comparing the write-off of receivables by customers may lead to information indicating that the employee has absconded with customer payments.

8. **Common Names and Addresses for Refunds** - Sales employees frequently make bogus refunds to customers for merchandise. The address shown for the refund is then made to the employee's address, or to the address of a friend or co-worker.
9. **Increasing Reconciling Items** - Stolen deposits, or bogus checks written, are frequently not removed, or covered, from the reconciliation. Hence, over a period of time, the reconciling items tend to increase.

Looking for Fraud in the General Ledger

The general ledger is the backbone of the financial records, holding every business transaction. Please note that sub-ledgers (i.e., accounts payable, fixed assets, inventory) may post in full detail (i.e., every accounts payable invoice broken out to the actual detail) but normally this sub-ledger activity is summarized on a periodic basis by account and posted. Regardless, the general ledger is a treasure-trove for fraud reduction.

The easiest way to commit financial statement fraud is for a high-ranking officer to post a nonstandard journal entry, falsifying the records. That way, the sub-ledger could show the proper balance but such balance could be adjusted at the general ledger level, with the nonstandard entry. Given this fact, a recent audit standard on fraud (SAS 99 – Consideration of Fraud in a Financial Statement Audit) and later audit risk alerts point to the specific need to review journal entries in the general ledger.

10. **Stratify General Ledger Detail Information** – Create a report listing the highest debit records and credit records using the **LARGE** function.
11. **Identify Nonstandard Journal Entries Made After Year End** – Scrutinize all manual entry records entered after year end and then summarize debits and credits by account.
12. **General Ledger Out-of-Balance** - When funds, merchandise, or assets are stolen and not covered by a fictitious entry, the general ledger will be out of balance. An inventory of the merchandise or cash is needed to confirm the existence of the missing assets.
13. **Adjustments to Receivables or Payables** - In cases where customer payments are misappropriated, adjustments to receivables can be made to cover the shortage. Where payables are adjusted, the perpetrator can use a phony billing scheme to convert cash to his or her own use.
14. **Looking for Fraud in the Sale of Assets** - Some companies use the sale of appreciated assets to hide losses from normal business operations and make the company appear more profitable than it really is, therefore make sure that you investigate any significant decreases in assets to determine if they were sold, then follow the receipts to make sure they have been properly recorded.

15. **Capitalizing Costs** - Capitalizing costs which have no future benefit is one way to enhance current earnings. Make sure all assets are indeed assets with future value, else they need to be written off.
16. **Unusual Behavior** - The perpetrator will often display unusual behavior, that when taken as a whole is a strong indicator of fraud. The fraudster may not ever take a vacation or call in sick in fear of being caught. He or she may not assign out work even when overloaded. Other symptoms may be changes in behavior such as increased drinking, smoking, defensiveness, and unusual irritability and suspiciousness.
17. **Complaints** - Frequently tips or complaints will be received which indicate that a fraudulent action is going on. Complaints have been known to be some of the best sources of fraud and should be taken seriously. Although all too often, the motives of the complainant may be suspect, the allegations usually have merit that warrant further investigation.

Looking for Fraud in Cash

18. **Stale Items in Reconciliations** - In bank reconciliations, deposits or checks not included in the reconciliation could be indicative of theft. Missing deposits could mean the perpetrator absconded with the funds; missing checks could indicate one made out to a bogus payee.
19. **Excessive Voids** - Voided sales slips could mean that the sale was rung up, the payment diverted to the use of the perpetrator, and the sales slip subsequently voided to cover the theft.
20. **Missing Documents** - Documents which are unable to be located can be a red flag for fraud. Although it is expected that some documents will be misplaced, the auditor should look for explanations as to why the documents are missing, and what steps were taken to locate the requested items. All too often, the auditors will select an alternate item or allow the auditee to select an alternate without determining whether or not a problem exists.

Looking for Fraud in Payroll

21. **Ghost Employees** - Ghost employee schemes are frequently uncovered when an auditor, fraud examiner, or other individual distributes paychecks to employees. Missing or otherwise unaccounted for employees could indicate the existence of a ghost employee scheme.
22. **Employee Expense Accounts** - Employees frequently conceal fraud in their individual expense account reimbursements. These reimbursements should be scrutinized for reasonableness and trends, especially in the area of cash transactions on the expense account.
23. **Large Payments to Individuals** - Excessively large payments to individuals may indicate instances of fraudulent disbursements.
24. **Employee Overtime** - Employees being paid for overtime hours not worked by altering time sheets before or after management approval.

Looking for Fraud in Inventory

25. **Inventory Shortages** - Normal shrinkage over a period of time can be computed through historical analysis. Excessive shrinkage could explain a host of fraudulent activity, from embezzlement to theft of inventory.
26. **Increased Scrap** - In the manufacturing process, an increased amount of scrap could indicate a scheme to steal and resell this material. Scrap is a favorite target of embezzlers because it is usually subject to less scrutiny than regular inventory.
27. **Post Office Boxes as Shipping Addresses** - In instances where merchandise is shipped to a post office box, this may indicate that an employee is shipping to a bogus purchaser.
28. **Excess Purchases** - Excess purchases can be used to cover fraud in two ways: 1. Fictitious payees are used to convert funds; and 2. Excessive purchases may indicate a possible payoff of purchasing agent.

Data Analysis Tools

Preparing Data for Data Analysis

Before you start to analyze data using Excel's various data commands such as **Sort**, **Autofilter**, **Subtotal**, **Grouping**, **Consolidate**, or **PivotTable**, you should first inspect your data to determine if it is in **Analysis-Ready** condition. In general, this means that the data must meet the following criteria:

- a. **Contiguous Data** – The data should contain no blank rows or blank columns. For example, the screen below shows blank rows (with solid lines). These rows should first be removed before proceeding with the creation of a PivotTable.

Batch	Date	Account	Account Description	Debit	Credit	Description	Source	Reference	Cum Debit	Cum Credit
02/02/2003 3:09:26 AM										
03020210001	01/05/2003	2-1200	Accounts Payable		25.00	Vendor Bill WATERK DEC-02		WATERCO	0.00	25.00
03020210001	01/05/2003	6-2940	Water	25.00		Water Bill For Dec -1 DEC-02		WATERCO	25.00	25.00
02/02/2003 3:10:47 AM										
03020210002	01/04/2003	2-1200	Accounts Payable		130.00	Vendor Bill TELCO - T-Dec-02		TELCO	0.00	130.00
03020210002	01/04/2003	6-2910	Telephone	130.00		Telephone Bill Dec C T-Dec-02		TELCO	130.00	130.00
02/02/2003 3:10:12 AM										
03020210003	01/05/2003	2-1200	Accounts Payable		1,470.50	Vendor Invoice ACC VI-900002		ACCESS	0.00	1,470.50
03020210003	01/05/2003	1-1300	Inventory	67.50		64MB 800MHz NON VI-900002		ACCESS	67.50	1,470.50
03020210003	01/05/2003	1-1300	Inventory	319.00		INTEL PENTIUM 4 1.1 VI-900002		ACCESS	386.50	1,470.50
03020210003	01/05/2003	1-1300	Inventory	4.00		Keyboard PS/2 BTC VI-900002		ACCESS	390.50	1,470.50
03020210003	01/05/2003	1-1300	Inventory	1,080.00		HP XE3 P3 1.06G 1E VI-900002		ACCESS	1,470.50	1,470.50
02/02/2003 3:19:28 AM										
03020210004	02/02/2003	2-1200	Accounts Payable		450.00	Vendor Bill CARREP VBILLS-1002		CARREP	0.00	450.00
03020210004	02/02/2003	6-2410	Vehicles, Mach. & Equipment	450.00		Vehicles, Mach. & E VBILLS-1002		CARREP	450.00	450.00
02/02/2003 3:20:48 AM										
03020210005	01/03/2003	2-1200	Accounts Payable		160.00	Vendor Bill ELECTRI E-Dec-02		ELECTRIC	0.00	160.00
03020210005	01/03/2003	6-2930	Electricity	160.00		Electricity Bill Dec -1 E-Dec-02		ELECTRIC	160.00	160.00

- b. **Single Row Data** – Some accounting systems produce data that spans two or more rows per transaction. If this is the case, your will need to clean that data so that all related information for a single transaction or data is contained on a single row. For example, the following data contains multiple rows of data related to a single sales order. In this case, the user must move and paste the data to fall on a single row. This is an example of data that requires a great deal of clean up.

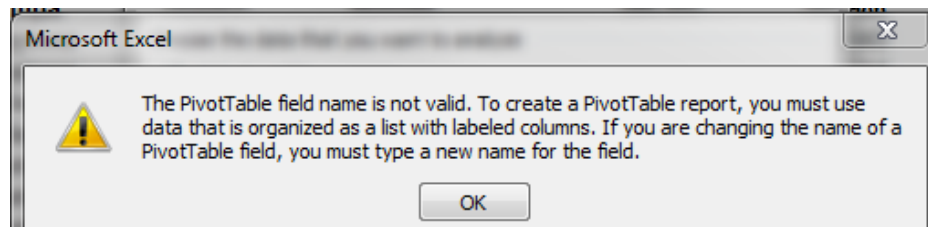
Using Excel to Detect Fraud

Item	T Part Number	Description	Site	Total CD	Total Ord	Total Inv	Total Rarvd	Total Bk Ord	Total In Stk	Ship Date	Sell Price	Need To Buy	On Ord For Stk	Unit Cost	
ComponentControl.com															
Emp# DBA		Cust PO# P340595		Customer: ABJ Aviation Corporation				Company Code: AAC4		Class Code: ISO-Y					
Order # 100022		Order Date: 10/1/2002		Due Date: 10/15/2002											
3	E	005-01064-0075	SWITCH,ROCKER TYPE	NE	1	0	1	0		10/15/2002	0	104	0.00		
1	S	005-02012-0023	POSITIONER	NE	1	0	1	0		10/15/2002	0	8	2,500.00		
2	S	005-02044-0003	BLACK BEZEL	AR	1	0	1	0		10/15/2002	0	0	1,357.61		
Ordered SubTotal:				4,905.01				Open SubTotal:		4,905.01		Billable SubTotal:		4,905.01	
Emp# PIETR		Cust PO# S3892		Customer: ACRU Hardware Company				Company Code: AHC1		Class Code: ISO-Y					
Order # 100074		Order Date: 10/2/2002		Due Date: 10/20/2002											
1	E	005-01082-0058	EMERGENCY EVACUATION SLIDE	SV	1	0	1	0			0	0	0.00		
2	S	010-06500	MASTER CYLINDER	OH	1	0	1	0			0	0	760.00		
Ordered SubTotal:				3,450.00				Open SubTotal:		3,450.00		Billable SubTotal:		3,450.00	
Emp# JOANN		Cust PO# 980		Customer: American Component L.L.C.				Company Code: ACLL1		Class Code: ISO-Y					
Order # 100379		Order Date: 10/2/2002		Due Date: 10/2/2002											
1	S	005-01082-0058	EMERGENCY EVACUATION SLIDE	SV	1	0	1	0		10/2/2002	0	0	950.00		
Ordered SubTotal:				1,989.66				Open SubTotal:		1,989.66		Billable SubTotal:		1,989.66	
Emp# DBA		Cust PO#		Customer: ABC Aerospace Incorporated				Company Code: AAJ2		Class Code: ISO-Y					

- c. **Column Headers** - The data should contain a unique header atop each column. For example, the following screen contains two columns labeled **Date**, while columns D and E contain no heading. These are both cases of data that should be cleaned before creating a PivotTable.

	A	B	C	D	E	F	G	H
1	Year	Date	Date			State	Attendance	Type
2	2010	10	5-Oct	Tech Savvy CPA	Acworth, GA	GA	13	Course
3	2009	6	3-Jun	Excel Advanced	Alpharetta, GA	GA	19	Course
4	2011	11	9-Nov	QuickBooks for CPAs	Alpharetta, GA	GA	33	Course
5	2010	12	14-Dec	Communicating with Computers	Buckhead, GA	GA	29	Course
6	2010	6	10-Jun	Excel Functions, Macros and Data	Buckhead, GA	GA	29	Course
7	2010	9	24-Sep	Microsoft Office 2010 and Window	Buckhead, GA	GA	0	Course
8	2010	6	8-Jun	Excel Hands On	Cobb Galleria, GA	GA	8	Course
9	2010	5	20-May	Accounting Software Expo	Atlanta, GA	GA	100	Conferen
10	2010	4	30-Apr	Property Management Conferenc	Atlanta, GA	GA	100	Conferen
11	2010	8	18-Aug	SEAS Conference	Atlanta, GA	GA	100	Conferen
12	2009	8	13-Aug	Excel Functions	Birmingham, AL	AL	63	Course
13	2009	9	8-Sep	Information Security	Birmingham, AL	AL	24	Course
14	2009	7	15-Jul	QuickBooks for CPAs	Birmingham, AL	AL	45	Course
15	2009	7	16-Jul	Tech Savvy CPA	Birmingham, AL	AL	42	Course
16	2010	4	23-Apr	Communicating with Computers	Bloomington, MN	MN	20	Course
17	2009	4	29-Apr	Excel for Intermediate	Bloomington, MN	MN	46	Course

If you attempt to analyze data that does not contain a column heading atop all columns, you will sometimes receive an error message, such as the example shown below.



If you have data with the same column heading used more than once, Excel will sometimes alter the column headings, for example when you create a PivotTable, so all headings will be unique.

- d. **Row Descriptions** – Generally, your data should repeat row descriptions for each row. For example, the screen below shows that the state and city descriptions are not repeated for each row in columns A & B.

	A	B	C	D	E	F	G	H
3	Carlton's Rental Properties							
4	2012 Analysis							
5								
6	State	City	Type	Manager	Revenue	Expenses	Profit	Vacancy Rate
7	Florida	Daytona	Duplex	Steve	75,254	58,698	16,556	25.5%
8			Duplex	Steve	77,184	87,218	(10,034)	56.4%
9			Duplex	Steve	77,184	68,694	8,490	25.5%
10			Duplex	Steve	76,219	60,213	16,006	54.4%
11			Townhome	Steve	52,140	41,191	10,949	35.6%
12			Townhome	Steve	52,800	59,664	(6,864)	25.5%
13			Townhome	Steve	52,140	41,191	10,949	27.6%
14			Triplex	Ginger	110,772	94,156	16,616	39.8%
15			Triplex	Ginger	121,198	112,714	8,484	45.0%
16			Triplex	Ginger	121,198	112,714	8,484	23.3%
17		Tampa	Apartment	Ginger	128,563	119,564	8,999	39.8%
18			Apartment	Ginger	217,504	184,878	32,626	53.3%
19			Duplex	Steve	79,114	64,873	14,240	25.5%

A solution for quickly filling in the missing row descriptions is presented later in these materials.

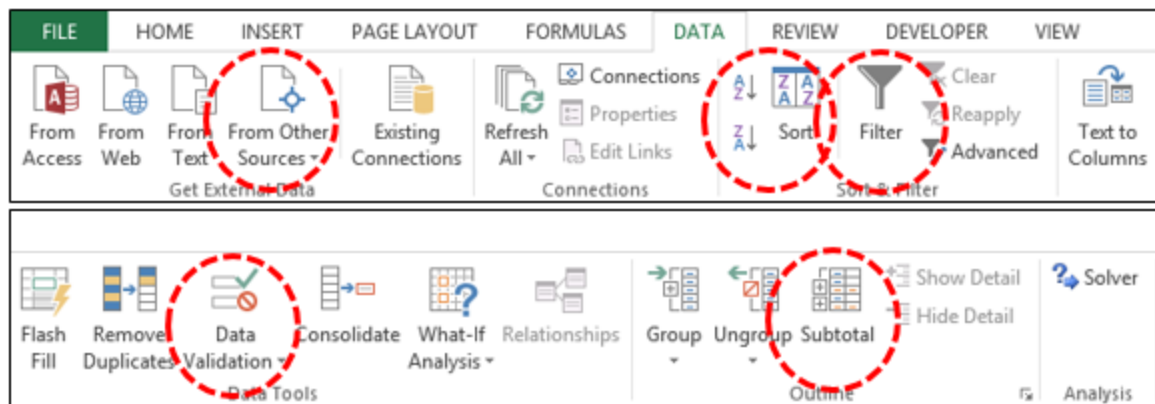
- e. **Transposing Headers and Rows** – In some cases, data may need to be transposed because many of Excel's Data tools use the column headings, not the row headings to crunch the data. To do this, copy the data, then select **Paste Special, Transpose, OK** to flip the data around.
- f. **Clean Data** – The data must be clean of empty text cells containing spaces, special characters, extra spaces within data, trailing spaces, trailing zeros, leading zeros, etc.

Data Analysis Tools

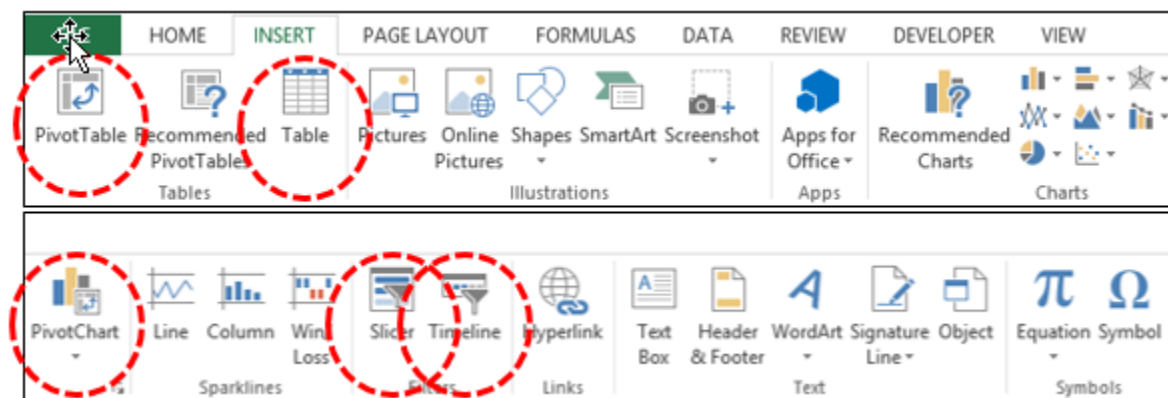
Excel provides specialized tools for analyzing data and generating financial reports, yet most CPAs are unaware of these tools or haven't tried using them before. Specifically useful are the **Subtotaling, Grand Totaling, Filtering, Consolidating, Grouping & Outlining, Drilling, OLAP Data Cubes, PivotTables, Sparklines, Data Bar Reporting, Conditional Formatting, Charting, Foot Notes and End Notes, Formula Auditing Tools, Error Checking, Functions, and Data Analysis Tools.**

The concepts discussed are intended to directly aid the CPA in summarizing, slicing, dicing and analyzing data, and generating related financial reports.

2013 Data Ribbon:



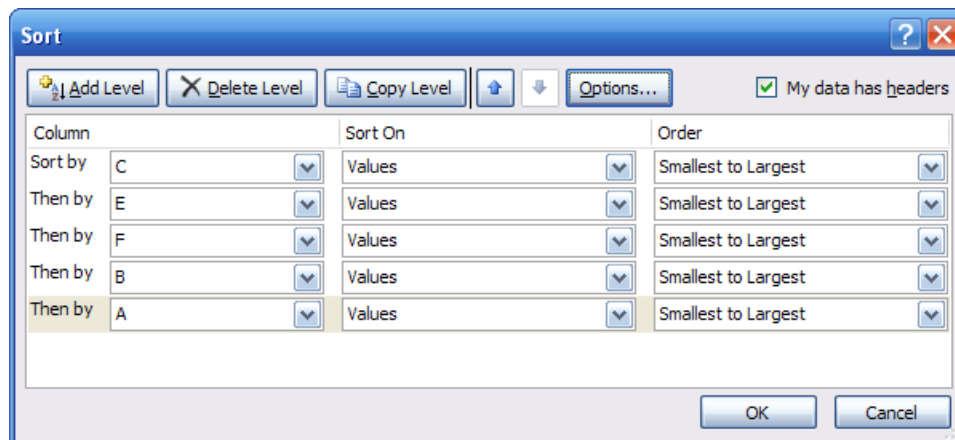
2013 Insert Ribbon:



Data Sort

You would think that every Excel user would already know all about sorting data in Excel, but I am frequently surprised to find that many users have missed a few key points related to using this tool. I don't mean to belittle you or talk beneath you, but humor me a copy of paragraphs and let's make sure you are fully up to speed on the following key sorting points:

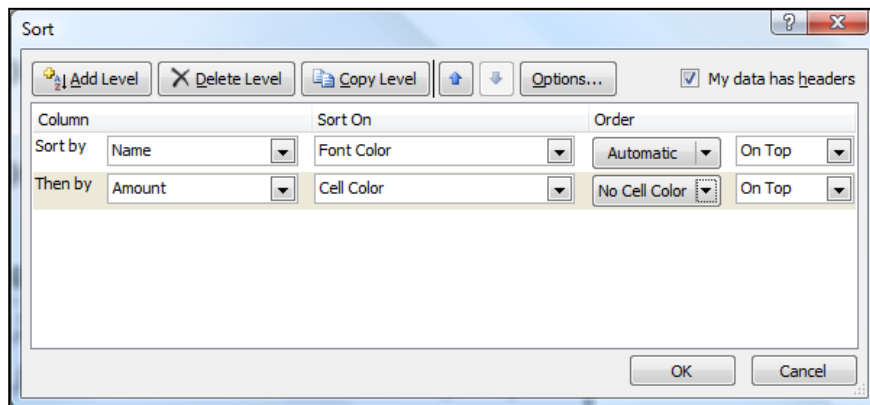
1. **Contiguous Data** - The "A to Z" sorting tool can sort a large matrix of data without having to highlight the area as long as the data is contiguous; that is to say that your data should contain no blank columns, no blank rows, and the columns must all be labeled with a column heading. When data is contiguous, all you need to do is place your cursor in a single cell in a given column and click the **Sort A to Z** or **Sort Z to A** buttons, and Excel will automatically select the entire matrix for sorting. Surprisingly many users waste a great deal of time highlighting sort ranges prior to sorting, but this step is often unnecessary.
2. **A to Z Button** - Simply place the cursor in the desired column for sorting, and press the A to Z or Z to A button as the case may be. Excel will automatically sort all continuous columns that have headings and all contiguous rows from the top row under the heading labels down to the last row in the selected column that contains data. *(Note - If you accidentally select 2 cells instead of just one, your results will not be correct.)*
3. **Sort by 64 Columns** - The "Sort" tool was enhanced beginning in Excel 2007 as it now provides the ability to sort by up to 64 columns, instead of just 3 columns. Presented below is a dialog box which shows this expanded functionality.



4. **Sort Left to Right** – Excel has always provided the ability to sort left to right. To do so, select the **Sort Options** box in the **Sort** dialog box and click the check box labeled **Sort Left to Right** as pictured below.



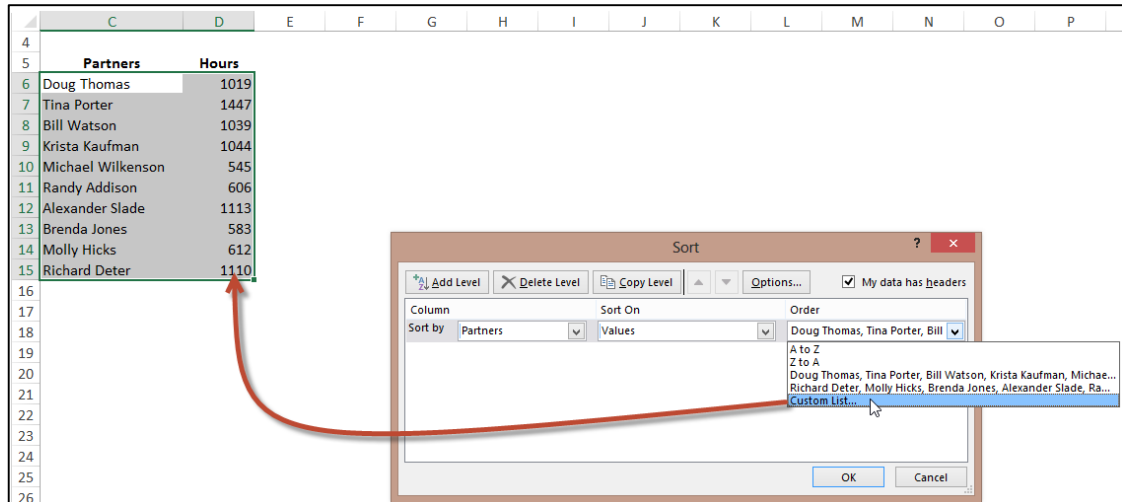
5. **Sort by Color** – beginning with Excel 2007, you can also sort by font color or by cell color, or both. This is handy in many ways. Sometimes CPAs use color to tag or mark certain cells - and later find it useful to be able to sort by those markings. In other situations CPAs use conditional formatting to apply color to cells using a wide variety of rules; and thereafter they can sort the data based on the resulting conditional colors. The two sort-by-color options are pictured below.



To be fair, it was sort of possible to sort by color in Excel 2003. To accomplish this task, you needed to use the **CELL** function in order to identify information about a given cell such as the cell color or font color. Thereafter, the results of that function could be used to sort rows – which effectively means that you can sort by color in Excel 2003 – but it takes a bit more effort.

6. **Sort By Custom List** – Another sorting capability in Excel is the ability to sort by **Custom List**. For example, assume a CPA firm has ten partners, and the Managing partner prefers to be shown at the top of the list, and the remaining Partners based on seniority. In this case, you could create a Custom List in the Excel Options dialog box listing the partners in the desired order, and then sort future reports based on that order.

Using Excel to Detect Fraud



To access the Custom List settings:

1. In Excel 2013 & 2010, select **File, Options, Advanced**, and scroll to the bottom, and then select **Edit Custom List**.
2. In Excel 2007, select **File, Options**, select **Edit Custom List** option a few inches down from the top.
3. In Excel 2003, select **Tools, Options**, and click the **Custom Lists** tab.

Filtering Data

AutoFilter allows you to view a subset of your data and when you are done, you can clear the filters to once again redisplay all of your data. To use this tool, start with any list of data and turn on the AutoFilter tool. Then position your cursor in the column you want to filter and use the drop down arrows to apply your filters as suggested in the screen below.

Carlton's Rental Properties 2014 Analysis								
Manage	State	City	Type	Revenue	Expense	Profit	Vacancy Rate	Police Visits
Billy			Apartment	47,520	45,619	1,901	24.7%	6
Billy			Triplex	91,463	72,256	19,207	35.6%	8
Billy			Apartment	356,040	259,909	96,131	25.5%	2
Billy			Triplex	154,276	143,477	10,799	65.0%	9
Billy			Apartment	113,924	93,417	20,506	25.5%	6
Billy			Triplex	94,936	77,848	17,089	31.5%	9
Billy			Apartment	90,305	70,438	19,867	25.5%	6
Billy			Triplex	394,276	366,677	27,599	15.4%	0
Billy			Apartment	116,122	84,769	31,353	13.4%	3
Billy			Apartment	92,621	82,433	10,188	18.7%	3
Billy			Triplex	69,466	66,687	2,779	54.4%	9
Billy			Apartment	261,005	221,854	39,151	23.3%	6
Billy			Triplex	57,024	54,743	2,281	56.4%	8
Ginger			Triplex	181,988	205,646	(23,658)	43.2%	2
Ginger			Triplex	121,198	112,714	8,484	15.4%	4
Ginger			Apartment	432,900	367,965	64,935	24.7%	2
Ginger			Apartment	96,768	70,641	26,127	31.8%	2

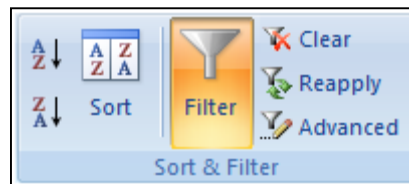
Once the filters are applied, you will see a subset of your data. For example, the screen presented below shows filtered data for only Macon and Savannah properties.

Carlton's Rental Properties 2014 Analysis									
Manage	State	City	Type	Revenue	Expense	Profit	Vacancy Rate	Police Visits	
25	Ginger	Georgia	Macon	Apartment	128,563	119,564	8,999	39.8%	8
26	Ginger	Georgia	Macon	Apartment	128,563	119,564	8,999	23.3%	1
27	Ginger	Georgia	Savannah	Apartment	76,032	75,272	760	65.0%	0
64	Steve	Georgia	Macon	Townhome	52,800	46,992	5,808	18.7%	9
65	Steve	Georgia	Macon	Duplex	76,219	60,213	16,006	26.5%	7
66	Steve	Georgia	Macon	Duplex	75,254	58,698	16,556	35.6%	5
67	Steve	Georgia	Macon	Apartment	296,700	216,591	80,109	23.3%	1
118	Jim	Georgia	Macon	Triplex	82,427	62,444	19,983	53.3%	1
121	Jim	Georgia	Macon	Duplex	90,981	57,088	33,892	27.6%	0
125	Jim	Alabama	Macon	Townhome	60,720	52,504	8,216	25.5%	8
126	Jim	Alabama	Macon	Townhome	59,961	36,248	23,713	35.6%	5

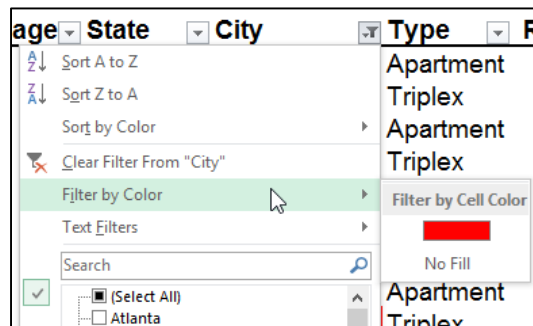
As filters are applied, a small funnel icon appears in the drop down arrow button to indicate that a filter has been applied to that particular column.

Key Points Concerning the AutoFilter Command:



1. **Contiguous Data** – The AutoFilter tool works best when you are working with data that is contiguous. In other words, your data should contain no blank columns, no blank rows, and the columns must all be labeled.
2. **Column Headings** – Your columns need unique column headings in a single row, and if the column headings are not in row 1, then the row above the column headings should be blank so Excel will auto detect the correct range.
3. **Filter by Multiple Columns** - You can filter by more than one column.
4. **Filters are Additive** - Each additional filter is based on the current filter and further reduces the subset of data.
5. **Removing Filters** – In all editions of Excel, a fast way to remove multiple filters is to turn **AutoFilter** off and then turn **AutoFilter** back on. In Excel 2007 and later editions, you can also click the **Clear** button in the **Sort & Filter Group** as pictured below.



6. **Filter by Color** – You can filter based on colors. For example, you can filter by cell color or by a list of numbers, you can filter by icon or by a custom filter.

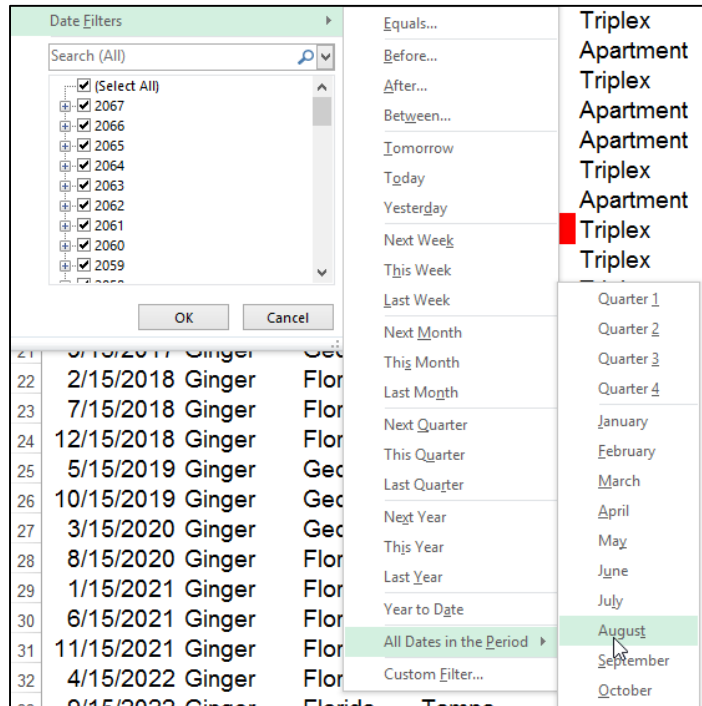


Note that the Color Filter is mutually exclusive as you cannot also filter by value or text when filter by color is applied, and vice versa.

7. **Filters Enabled** - A drop-down arrow  means that filtering is enabled but not applied.
8. **Filter Applied** - A Filter button  means that a filter is applied.

9. **Filter Spanning** - The commands under the **All Dates** in the **Date Filters** menu, such as January or Quarter 2 filter by the period no matter what the year. This can be useful, for example, to compare sales by a period across several years.

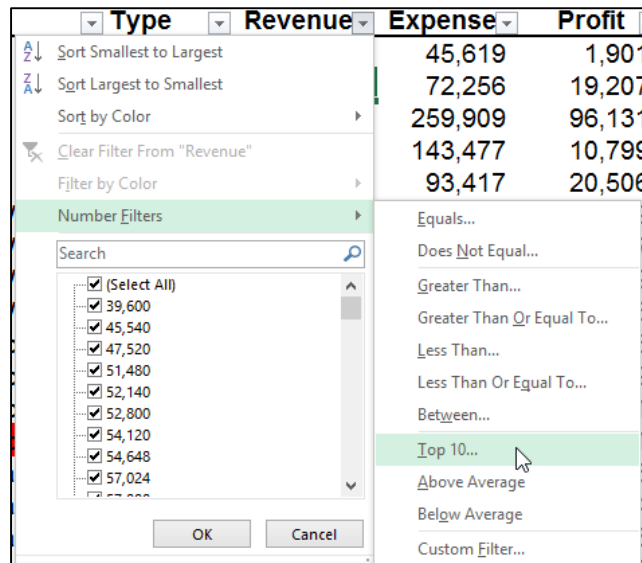
10. **This Year vs. Year-to-Date** - **This Year** and **Year-to-Date** are different in the way that future dates are handled. **This Year** filtering can return dates in the future for the current year, whereas **Year-to-Date** only returns dates up to and including the current date based on the computer's time clock.



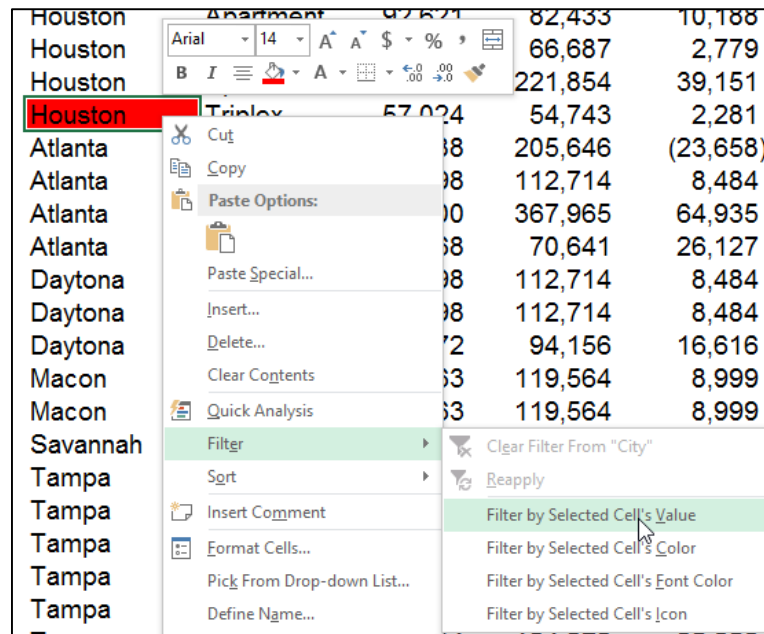
11. **Filtering Dates** - All date filters are based on the Gregorian calendar as decreed by Pope Gregory XIII, after whom the calendar was named, on 24 February 1582. The Gregorian calendar modifies the Julian calendar's regular four-year cycle of leap years as follows: Every year that is exactly divisible by four is a leap year, except for years that are exactly divisible by 100; the centurial years that are exactly divisible by 400 are still leap years. For example, the year 1900 is not a leap year; the year 2000 is a leap year.

12. **Filtering By Days of Week** - If you want to filter by days of the week, simply format the cells to show the day of the week, or insert a new column and use the **WEEKDAY** function to calculate the week day, and then apply filters using this new column.

13. **Top & Bottom Filtering** - On the **Data** tab, in the **Sort & Filter** group, click **Filter**. Point to **Number Filters** and then select **Top 10**. To filter by number, click **Items**. To filter by percentage, click **Percent**. Note - Top and bottom values are based on the original range of cells or table column and not the filtered subset of data.



14. **Above & Below Average Filtering** - On the **Data** tab, in the **Sort & Filter** group, click **Filter**. Select **Number Filters, Above/Below Average**. Note – These values are based on the original range of cells or table column and not the filtered subset of data.
15. **Filtering Out Blanks** - To filter out blanks, in the **AutoFilter** menu at the bottom of the list of values, de-select the check box labeled **Blanks**.
16. **Filtering By Color** - Select **Filter by Color**, and then depending on the type of format, select **Filter by Cell Color**, **Filter by Font Color**, or **Filter by Cell Icon**. Note that these filter options only show up when there are actual cell colors, font colors or icons included in the data range.
17. **Filter by Selection** - To filter by text, number, date, time, or color for selected cell(s), select the cells to be used as a filter basis and then right-click that selection, and from the popup menu select **Filter**, **Filter by Selected Cell's Value**, (or **Filter by Selected Cell's Color**, **Filter by Selected Cell's Font Color**, or **Filter by Selected Cell's Icon**).



18. **Refreshing Filters** - To reapply a filter after the data changes, click a cell in the range or table, and then on the **Data** tab, in the **Sort & Filter** group, click **Reapply**.

Data Form

Excel's Data Form tool provides a data input window which makes Excel look and behave more like a database, such as Microsoft Access. (Note that in Excel 2013, 2010 and 2007, the Form tool button has not been included on the Ribbon, so to use it you will first need to add the Form tool button to the Quick Access Toolbar.)

	A	B	C	D	E	F	G
1	Last Name	First Name	Address	City	State	Zip	Phone
2	Collins	Carlton	100 Peachtree Street	Atlanta	GA	30062	770.842.5902
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							

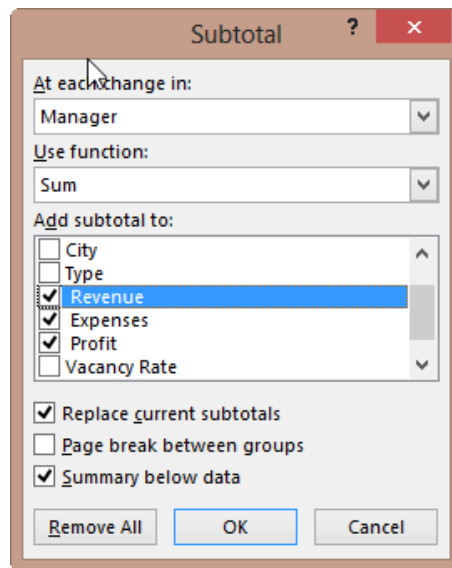
A data form provides a convenient means to enter or display one complete row of information in a range or table without scrolling horizontally. Some people, especially those who are used to using databases, find that using a data form can make data entry easier than moving from column to column when you have more columns of data than can be viewed on the screen.

Key Points using Data Form:

1. You cannot print data from a data form.
2. Because a data form is a modal dialog box, you cannot use either the Excel Print command or Print button until you close the data form.
3. You might consider using the Windows Print Screen key to make an image of the form, and then paste it into Microsoft Word for printing.

Data Subtotals

Excel's **Subtotal** command automatically calculates and inserts subtotals and grand totals in your list or table. Once inserted, Excel recalculates subtotal and grand totals as you enter and edit the detail data. The Subtotal command also outlines the list so that you can display and hide the detail rows for each subtotal. Examples of the **Subtotal** dialog box and a resulting subtotaled table are shown below.



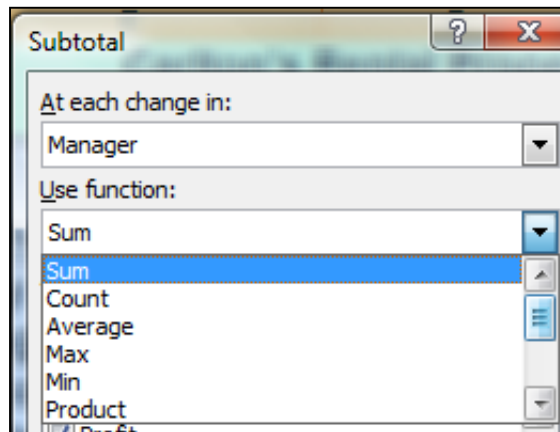
Carlton's Rental Properties 2014 Analysis						
Manager	State	Revenue	Expenses	Profit	Police Visits	
Billy Total		1,938,977	1,640,126	298,851	75	
Ginger Total		2,340,914	2,211,002	129,912	78	
Jacob Total		3,128,030	2,763,405	364,625	79	
Kathy Total		1,534,551	1,378,893	155,658	13	
Steve Total		1,679,088	1,439,202	239,886	117	
Erin Total		4,921,875	3,388,993	1,532,882	153	
Jim Total		5,984,923	4,093,049	1,891,874	131	
Ellen Total		1,307,997	818,672	489,325	78	
Grand Total		22,836,355	17,733,341	5,103,014	724	

To display subtotals and grand totals at the top instead of the bottom, deselect the checkbox labeled **Summary below data**.

Manager	State	City	Type	Revenue	Expenses	Profit
Grand Total				22,836,355	17,733,341	5,103,014
Billy Total				1,938,977	1,640,126	298,851
Billy	Texas	Dallas	Apartment	47,520	45,619	1,901
Billy	Texas	Dallas	Triplex	91,463	72,256	19,207
Billy	Texas	Dallas	Apartment	356,040	259,909	96,131

Key points to Consider When Using Subtotaling are as follows:

1. **Contiguous Data** – The Subtotal tool works best when you are working with data that is contiguous. In other words, your data should contain no blank columns, no blank rows, and the columns must all be labeled.
2. **Sort Before You Subtotal** - You must sort the data by the column you wish to subtotal by, else you will receive erroneous results.
3. **Other Mathematical Applications** - The Subtotal tool not only calculates subtotals, but it can also calculate minimums, maximums, averages, standard deviations, and other functions.



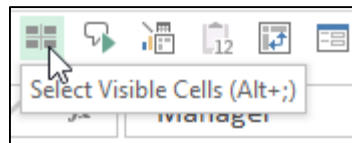
4. **Subtotals in 2013, 2010 & 2007 Tables** – Excel 2007 added a new **Table** tool which enables **Subtotals** a little differently; the Subtotal tool appears at the bottom of each column in each **Table**, as shown in the screen below.

75,254	58,698	16,556
296,700	216,591	80,109

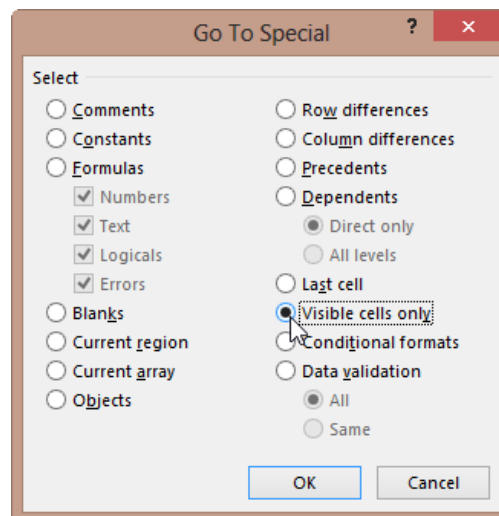
None
Average
Count
Count Numbers
Max
Min
Sum
StdDev
Var
More Functions...

5. **Automatic Outlining** – The **Subtotal** tool automatically inserts **Outlines**, which allows you to collapse or expand your data.

6. **Copying Outline Data** - Some CPAs also like to copy and paste collapsed subtotal data to another location, but they find this process copies and pastes all of the data – not just the summary data they desire. In this situation, there are two ways to achieve a clean copy and paste without grabbing all the hidden data as follows:
- CTRL key** – Hold the **Control Key** down while you individually click to select individual rows; this action will enable you to copy and paste selected data. However, this approach can sometimes be problematic because if you miss-click, you have to start over.
 - Select Visible Cells** – A better approach is to use the **Select Visible Cells** tool. This tool will select on the data you can see, after which the copy and paste routine will yield the desired results. This option is better because it is faster and less error prone.



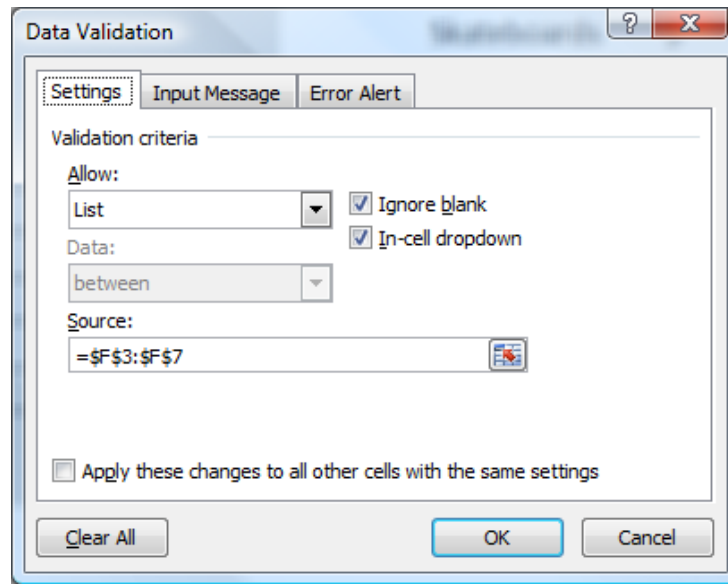
- Go To** – You can also select visible cells using **Go To**. To do this, press **F5** to launch the **Go To** tool and then click **Special**. In the **Go To Special** dialog box, select the radio button labeled **Select Visible cells** and press **OK**.



- ALT + ;** - The **Alt + ;** key combination is the shortcut to using the Select Visible Cells Tool.

Data Validation

Data Validation can be used to limit the data that can be entered into a cell. For example, you might want the user to enter only values between 1% and 99%. You might also use this tool to enable data input to a drop down list which offers two advantages in that it can be faster and more accurate. To create a dropdown list, enter a list into sequentially cells in Excel. Next, from the **Data** tab select **Data Validation, Data Validation** (yes, again), then in the dialog box (as shown below) select **List** from the **Allow** dropdown box and then indicate the data range for your list in the **Source** box.



After making all the necessary selections in the validation list dialog box, your worksheet will produce a cell containing a drop down list (shown in cell A10 below) that behaves as shown.

Data Validation - List			
Sales Order Form			
Customer Name	<input type="text"/>		
Address	<input type="text"/>		
Phone	<input type="text"/>		
Item	Quantity	Price	Total
<input type="text"/>			
Bicycles			
Disc Golf Sets			
Kites			
Skateboards			
Surf Boards			
			0

Products	Price
Bicycles	\$ 275
Disc Golf Sets	\$ 19
Kites	\$ 24
Skateboards	\$ 89
Surf Boards	\$ 345

You can also provide messages to define what input you expect for the cell, and instructions to help users correct any errors. For example, on a worksheet, you can set up a cell to allow only

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account numbers that are exactly three characters long. When users select the cell, you can show them a message such as this one:


3	Employee Costs	
4	110 Payroll	
5	120 IRS/FICA/Wk comp/State/SDI	
6	140 Retirement Plan	
7	<input type="text"/> Commissions/Bonuses	
8		
9	Su	
10	2	Services
11	2	
12		

Account Number
Enter a three-digit account number from the chart of accounts, which you can find at <http://Finance\documents on the intranet>.

If users ignore this message and type invalid data in the cell, such as a two-digit or five-digit number, you can display an actual error message. In a more advanced scenario, you might use data validation to calculate the maximum allowed value in a cell based on a value elsewhere in the workbook. In the following example, the user has typed \$4,000 in cell E7, which exceeds the maximum limit specified for commissions and bonuses.

	A	B	C	D	E	F
1		Budget Input -- Marketing				
2		Account		Actual	Projected	
3		Employee Costs				
4		110 Payroll		45,328	60,000	
5		120 IRS/FICA/Wk comp/State/SDI		15,997	25,000	
6		140 Retirement Plan		6,249	8,000	
7		160 Commissions/Bonuses		2,720	4000	
8						
9						
10						
11						
12						
13						
14						
15						

Over budget

 Commissions and bonuses cannot exceed \$3600 (6% of payroll).

Continue?

[Was this information helpful?](#)

If the payroll budget were to increase or decrease, the allowed maximum in E7 would automatically increase or decrease with it.

Data Table (“What-if Analysis”)

Data tables are part of the collection of what-if analysis commands, which include:

1. Data Tables
2. Goal Seek
3. Scenarios

The **Data Table** command enables the process of changing values in cells to see how those changes will affect the outcome. For example, you can use a data table to vary the interest rate and term length used in a loan to determine possible monthly payment amounts.

There are two types of **Data Tables** – **One Way** and **Two Way**. A data table cannot accommodate more than two variables. If you want to analyze more than two variables, you should use scenarios. Although it is limited to only one or two criterion (one for the row input cell and one for the column input cell), each criterion can include as many different variable values as you want. (In contrast, a **Scenario** can have a maximum of 32 different criterion, but you can create as many **Scenarios** as you want.)

Loan Analysis Example

In this exercise, we start by creating a simple Payment function to calculate the payment amount of a loan given a loan amount, interest rate and number of periods.

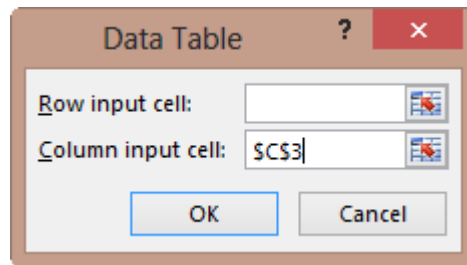
	A	B	C	D
1	Loan Amount		300,000	
2	Interest rate		6% Per Year	
3	Number of Periods		30 Years	
4	Payment Amount		\$1,798.65	
5				

The next step is to create a **Two-Way Data Table** displaying the resulting payment amount given a variety of lengths of the loan. This process is started by creating a list of the alternative loan amounts, as shown below in **B8, B9, B10**, etc. Cell **C7** must reference the results you want to be displayed in the table.

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	A	B	C	D
1	Loan Amount		300,000	
2	Interest rate		6% Per Year	
3	Number of Periods		30 Years	
4	Payment Amount		<u>\$1,798.65</u>	
5				
6				
7			\$ 1,799	
8		1		
9		2		
10		3		
11		4		
12		5		
13		6		
14		7		

Next, highlight the data table range and use the **Data Table** command on the **Data** tab (as shown below) to generate the desired table.



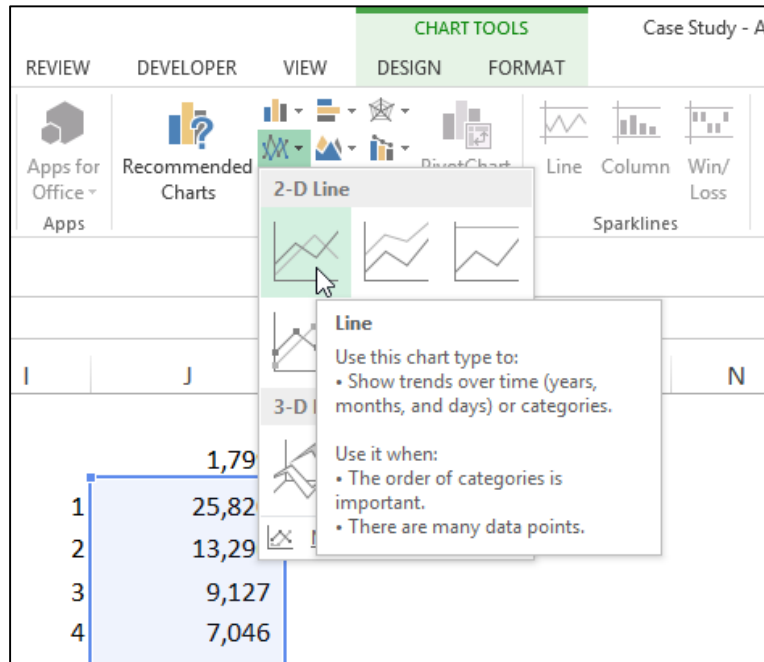
This process will generate the following table:

	A	B	C	D
1	Loan Amount		300,000	
2	Interest rate		6% Per Year	
3	Number of Periods		30 Years	
4	Payment Amount		<u>\$1,798.65</u>	
5				
6				
7			\$ 1,799	
8		1	\$ 25,820	
9		2	\$ 13,296	
10		3	\$ 9,127	
11		4	\$ 7,046	
12		5	\$ 5,800	
13		6	\$ 4,972	

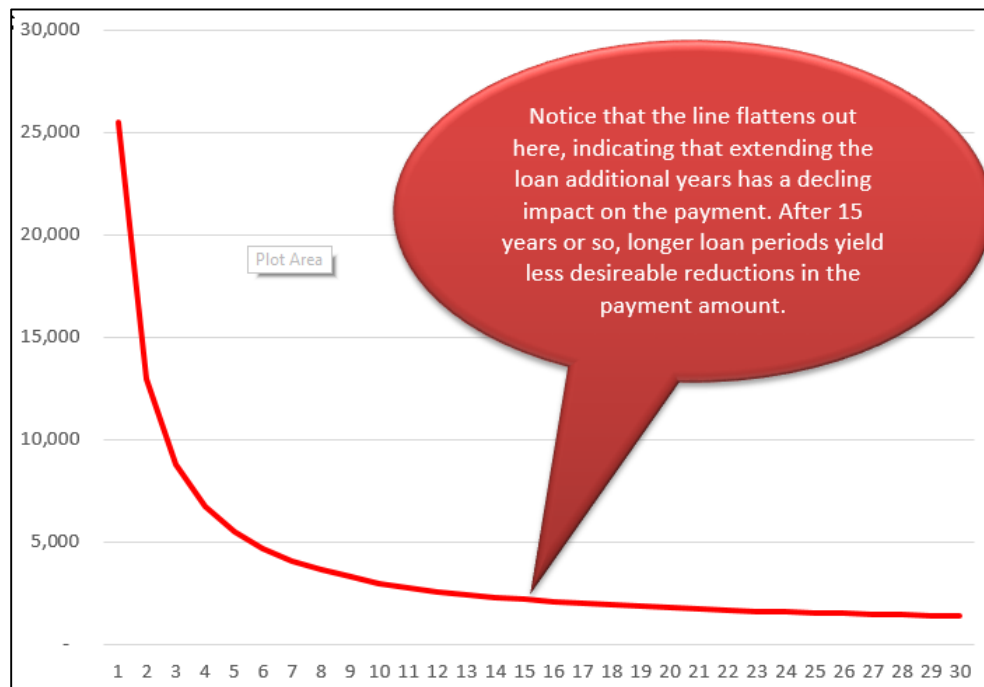
This table tells us that the same loan amount will require a monthly payment of \$4,972 to pay the loan off in just 6 years, or a monthly payment of \$5,800 to repay the loan in just 5 years.

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The next step in this exercise is to generate a line chart based on the data table we just created. This line chart will provide some interesting observations regarding the benefits and detriments of paying off loans over longer periods.



The resulting chart is shown as follows:



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Based on this, no one should ever obtain a fair market loan for more than 15 years, the reduction in payments simply aren't worth the additional length of the loan. This same basic behavior is seen whether the interest rate is 1% or 100%, or whether the loan amount is \$1,000 or \$10,000,000. The only time you might be justified in obtaining a loan longer than 15 years might be when you are extended a favorable interest rate (perhaps from a rich uncle), better than a fair market interest rate.

Goal Seek

If you know the result that you want from a formula, but are not sure what input values are needed to produce your desired results, use **Goal Seek**. For example, suppose that you have decided to purchase a house, but you don't know how much house you can afford. In this case, know how the interest rate (3.75%) and how long you want to take to pay off the loan (15 years), and the amount you can afford to pay each month (\$2,800). In this case, you can use **Goal Seek** to work backwards to figure out how much house you can afford. Start by calculating the monthly payment based on any random home loan amount as pictured below.

	A	B	C	D	E
1	Loan Amount	300,000			
2	Interest Rate	3.75%	Percent		
3	Duration of Loan	15	Years		
4					
5	Monthly Payment	2,181.67			

Next, from the **Data** tab, select **What-If Analysis, Goal Seek**. Fill in the parameters to set the payment amount to \$2800 by adjusting the Loan Amount, as shown, and then click OK.

	A	B	C
1	Loan Amount	385,027	
2	Interest Rate	3.75%	Percent
3	Duration of Loan	15	Years
4			
5	Monthly Payment	2,800.00	
6			

Goal Seek ? X

Set cell:

To value:

By changing cell:

OK Cancel

The result is that a person with \$2,800 available to make monthly payments can afford to purchase a home costing up to \$385,027 (assuming a 15 year loan and 3.75% interest rate) – as pictured above. (Keep in mind that anyone actually following this scenario would need to consider that homes also come with other monthly obligations including real estate taxes, insurance maintenance, etc.)

Data - Text to Columns

CPAs sometimes receive data from their clients or IT departments that is in text form. When this happens, Excel can split the contents of one or more cells in a column and distribute those contents as individual parts across other cells in adjacent columns. For example, the worksheet below contains a column of full names and amounts that you want to split into separate columns. The **Text to Columns** wizard parses the data automatically into separate cells. To use this tool, select the cell, range or entire column that contains the text values that you want to split.

	D	E	F	G	H
178	David Greene,Individual,12.9,1612.5				
179	Hanson Fish Sales,Corporate,9,1125				
180	Hanson Fish Sales,Corporate,2.9,362.5				
181	Willie McClendon,Individual,5,625				
182	Willie McClendon,Individual,2.6,325				
183	Mindy Simmon,Individual,22,2200				
184	Tommy Pruitt,Individual,4,400				
185	Cascade, Inc.,Corporate,6,600				

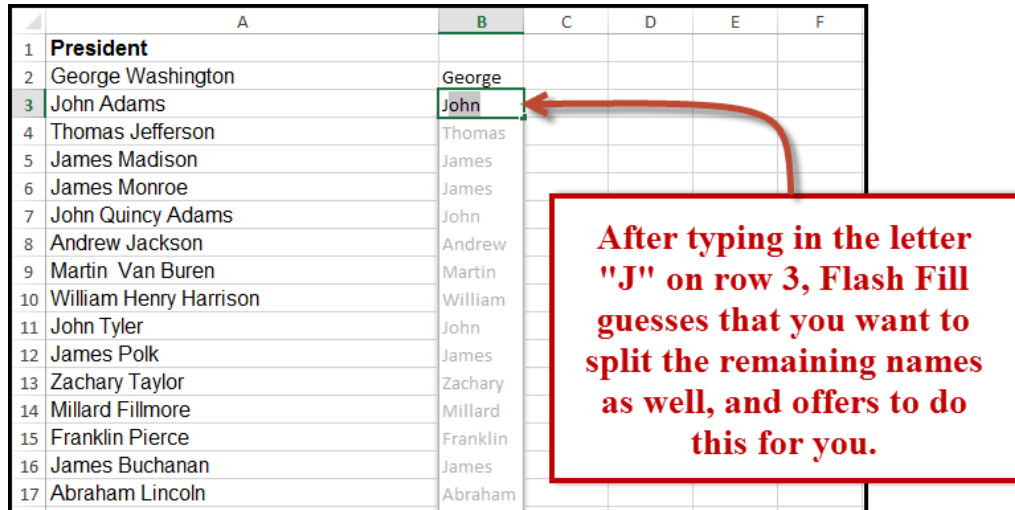
	D	E	F	G	H
178	David Greene	Individual	12.9		1,613
179	Hanson Fish Sales	Corporate	9.0		1,125
180	Hanson Fish Sales	Corporate	2.9		363
181	Willie McClendon	Individual	5.0		625
182	Willie McClendon	Individual	2.6		325
183	Mindy Simmon	Individual	22.0		2,200
184	Tommy Pruitt	Individual	4.0		400

Notes:

1. A range that you want to split can include any number of rows, but it can include no more than one column.
2. You also should make sure there are enough blank columns to the right of the selected column to prevent overwriting existing data in those adjacent columns.

Flash Fill

Of all the Office 2013 applications, Excel is the beneficiary of the most impressive enhancements. Excel's new **Flash Fill** watches you work and applies logic to help you complete your tasks. The example pictured below contains a list of 44 first and last names in Column A, which I want to separate into Columns B and C. As I start typing the first name of the second record in Column B; Excel's **Flash Fill** guesses what I'm trying to do and offers to fill in the remaining 42 first names (as shown in grey text).



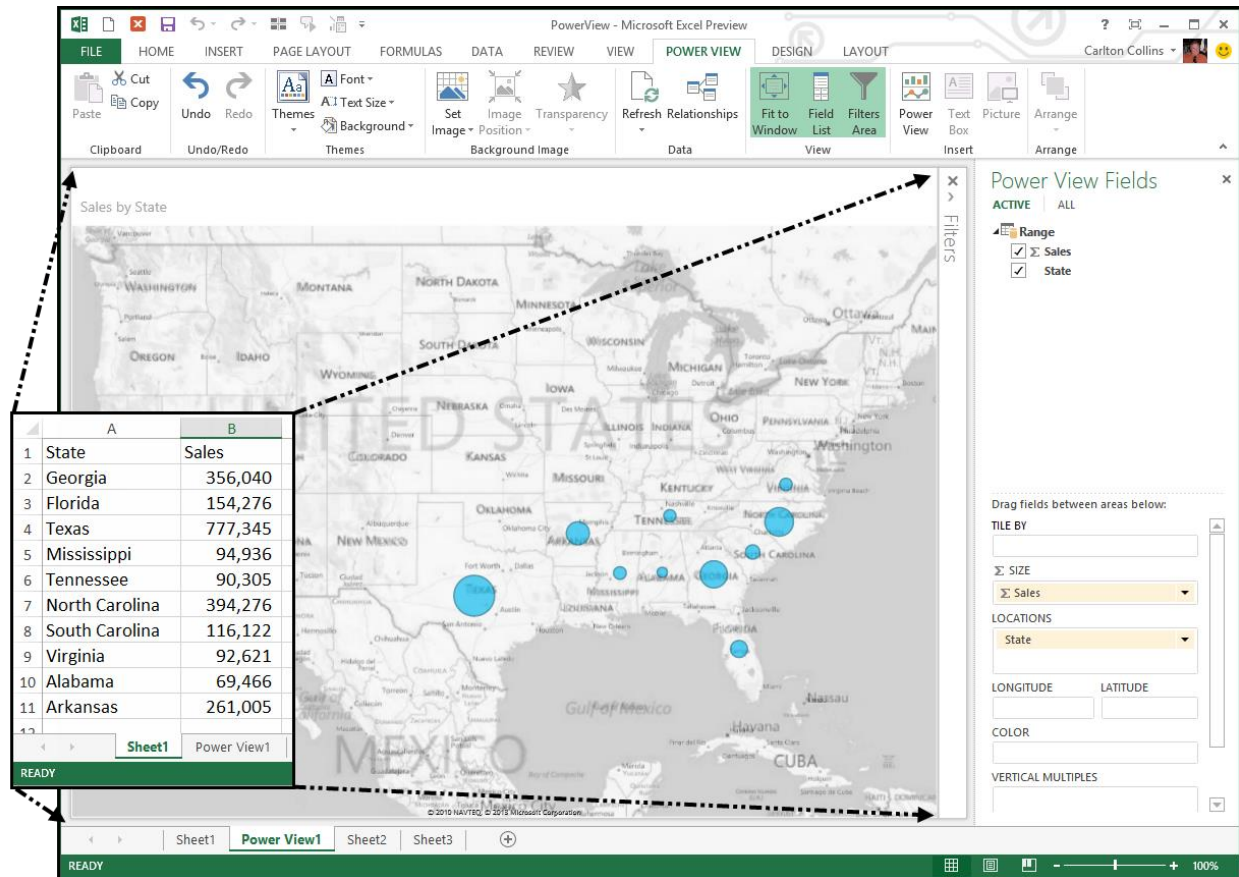
Data Grouping & Outlining

If you have a list of data that you want to group and summarize, you can create an outline of up to eight levels. Each inner level (represented by a higher number in the outline symbols) displays detailed data for the preceding outer level, represented by a lower number in the outline symbols. Use an outline to quickly display summary rows or columns, or to reveal the detail data for each group. You can create an outline of rows (as shown in the example below), an outline of columns, or an outline of both rows and columns.

	A	C	D	E	F	G
1	Income Statement by Month					
3	Report date: 1/1/2011..12/31/2013					
5	Account	Category	Description	1/31/2011	2/28/2011	3/31/2011
10		Sales Total		(2,047,351)	(2,051,709)	(2,051,413)
15		Service Total		(169,638)	(169,904)	(169,001)
16	000-4130-01	Installation	Installation Charges - West	(13,542)	(13,998)	(14,198)
17	000-4130-02	Installation	Installation Charges - Central	(145,906)	(146,071)	(145,481)
18	000-4130-03	Installation	Installation Charges - East	(282,819)	(283,051)	(283,506)
19	000-4130-04	Installation	Installation Charges - Canada	(87,371)	(88,121)	(88,848)
20		Installation Total		(529,637)	(531,240)	(532,034)
25		Repair Total		(91,793)	(95,030)	(95,322)
30		Sales Discounts Total		328,958	327,865	327,018
35		Trade Discounts Total		146,985	148,012	148,057
40		Sales Returns Total		279,301	277,507	275,729
45		COGS Total		282,104	283,035	282,564
55		Variance Total		3,072	5,746	5,766
64		Salaries Total		260,428	258,616	256,952
69		Insurance Total		29,772	29,782	28,301
75		Depreciation Total		28,467	27,174	28,096
78		Repairs Total		13,106	11,521	11,527

PowerView

Excel's new **PowerView** inserts new worksheets connected to your data, and then enables you to create new report types, such as the interactive map chart presented below. The resulting PowerView Map report is zoomable, and filters can be applied to display partial data.



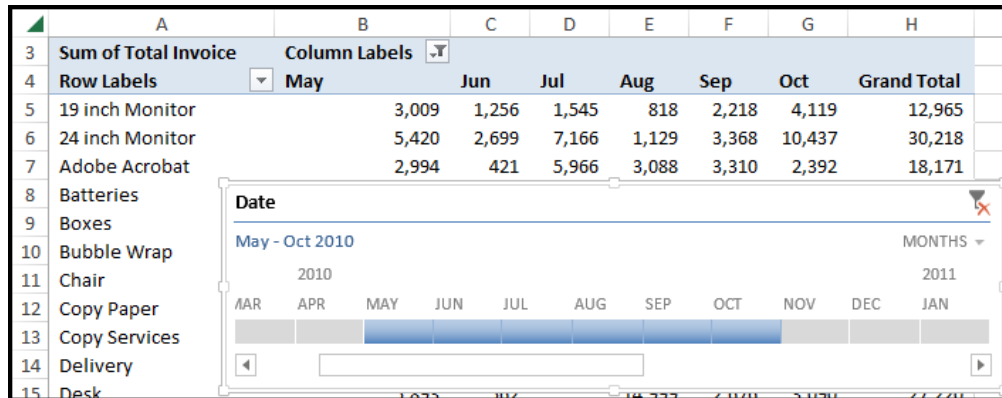
PowerView worksheets can be published as standalone, interactive reports to Microsoft SharePoint's PowerPivot Gallery or other reporting service destinations. Some of the tools provided by PowerView include the ability to create a dashboard containing multiple PowerViews, apply themes and backgrounds, insert pictures and text boxes, insert collapsible and expandable tiles, and add data slicers.

PowerView Learning Points

1. **Included** - PowerView isn't included in Office Home editions. Power View and PowerPivot are only available in the Office Professional Plus and Office 365 Professional Plus editions.
2. **Worksheet** - PowerView is another sheet in the workbook, and acts like a Dashboard.
3. **Fields** - Add data to the PowerView by selecting fields, much like you do for PivotTables.
4. **Play** - You can play charts to see how they change over time.
5. **PowerView uses PowerPivot** - Known to be extremely fast for retrieving and sorting data.
6. **Relationships** - PowerView can integrate multiple data sets via relationships.

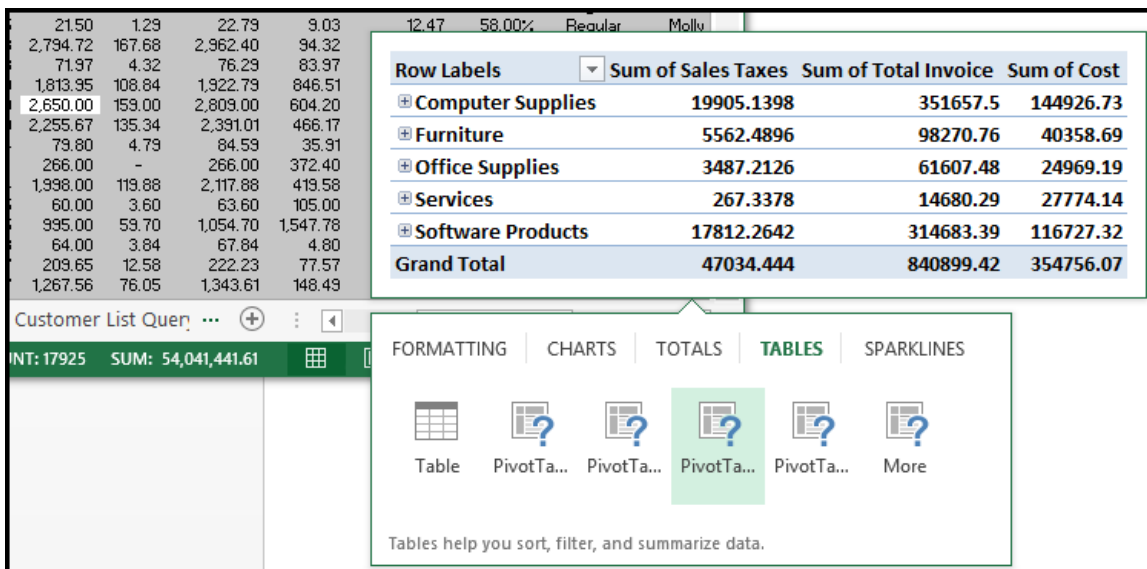
Timeline Slicer

CPAs who work with PivotTables will likely appreciate Excel’s new **Timeline Slicer** which helps users *slice and dice* Pivot data that contain dates. As an example, selecting the dates May through October on the Timeline slicer pictured below adjusts the PivotTable to display May thru October data.



Quick Analysis

Excel’s **Quick Analysis** tool also helps you analyze data by offering a variety of formatting, charts, totals, tables and sparkline layouts to instantly summarize large volumes of data (*see screen below*). When using Quick Analysis to scrutinize text-only data, text specific options for highlighting duplicate or unique text items appear.



Queries

Excel 2010, 2007 & 2003 include pre-designed “queries” that can import commonly used data such as stock quotes for updating a stock portfolio. All you need is a connection to the internet and of course, some stock ticker symbols. In Excel 2010 or 2007 select **Data, Existing Connections, MSN MoneyCentral Stock Quotes** (or in Excel 2003 select **Data, Import External Data, Import Data Existing Connections, MSN MoneyCentral Stock Quotes**) and then walk through the web query wizard for importing stock quotes. In just a few seconds, Excel will retrieve Real-Time data for NYSE, NASDAQ & AMEX, and 20 minute delayed stock prices from other exchanges (during the hours when the stock market is open) and display a grid of complete up-to-date stock price information that is synchronized to the stock market’s changing stock prices. With each click of the “Refresh” button, the stock price information in Excel is updated - this sure beats picking numbers out of the newspaper.

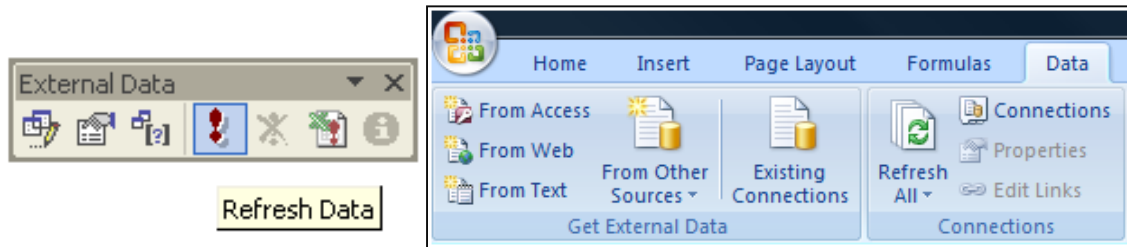
	A	B	C	D	E	F	G	H	I	J	K	L	M
1		Friday, April 24, 2009											
2		11:34:42 AM											
3		Stock Quotes Provided by MSN Money											
4		Click here to visit MSN Money											
5													
6		Microsoft Corp.	Chart	News	Last	Previous Close	High	Low	Volume	Change	% Change	52 Wk High	52 Wk Low
7		Apple Inc.	Chart	News	20.29	18.92	20.45	19.5	66,077,415	1.37	7.24%	32.1	14.87
8		Coca-Cola Co.	Chart	News	124.32	125.4	125.14	123.73	6,275,076	-1.08	-0.86%	192.24	78.2
9		United Parcel Service Inc.	Chart	News	42.87	42.92	43.09	42.71	3,205,193	-0.05	-0.12%	61	37.44
10		International Business Machines Corp.	Chart	News	53.48	53.33	54.04	52.53	2,533,150	0.15	0.28%	74.14	37.99
11		Wal-Mart Stores Inc.	Chart	News	100.33	101.42	101.97	100.09	2,665,080	-1.09	-1.07%	130.93	69.5
12					48.73	48.86	49.56	48.51	8,042,577	-0.13	-0.27%	63.85	46.25

Completing the Stock Portfolio – Next link the grid data to another worksheet, and insert new columns containing the number of shares owned, as well as an additional column to compute the total value based on shares owned, as shown below.

	A	B	C	D	E	F	G	H	I	J	K	L	
1		Friday, April 24, 2009											
2		11:40:17 AM											
3		Stock Quotes Provided by MSN Money											
4													
5													
6		Microsoft Corp.			Last	Shares Owned	Current Value	Previous Close	High	Low	Volume	Change	% Change
7		Apple Inc.			20.29	13,500	273,915	18.92	20.45	19.5	66077415	1.37	0.0724
8		Coca-Cola Co.			124.32	2,400	298,368	125.4	125.14	123.73	6275076	-1.08	-0.0086
9		United Parcel Service Inc.			42.87	12,000	514,440	42.92	43.09	42.71	3205193	-0.05	-0.0012
10		International Business Machines Corp.			53.48	1,780	95,194	53.33	54.04	52.53	2533150	0.15	0.0028
11		Wal-Mart Stores Inc.			100.33	2,800	280,924	101.42	101.97	100.09	2665080	-1.09	-0.0107
12					48.73	8,300	404,459	48.86	49.56	48.51	8042577	-0.13	-0.0027
							1,867,300						

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Refreshing the Stock Prices - Once you have created your portfolio, simply click the Refresh Data button on the “External Data” Toolbar in Excel 2003 or on the “Data Ribbon” in Excel 2010 & 2007 shown below to update the current value of your Portfolio.

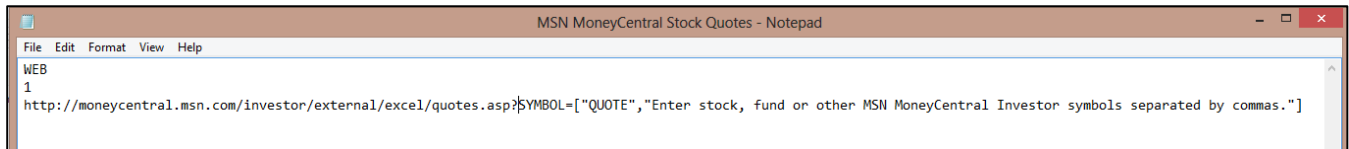


Query Parameters - There are numerous options to help you extract exactly the data you want the way you want it. The “Web Query Parameters Box”, “Web Query Options box” and “External Data Properties Box” provide numerous options for controlling your web query.

Excel 2013 Stock Quote Queries

In Excel 2013, for unknown reasons Microsoft has removed the stock quote query option, therefore below are instructions for restoring this option.

1. Launch Notepad (**Start, Programs, Windows Accessories, Notepad**)
2. Enter the following information exactly:

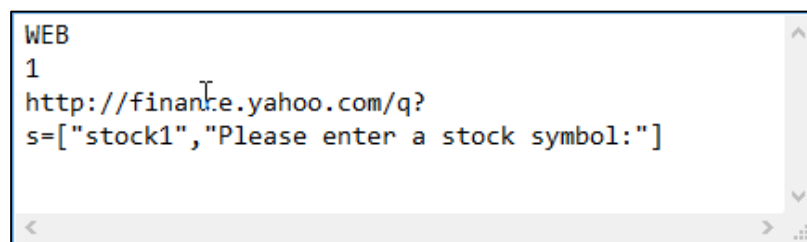


Web

1

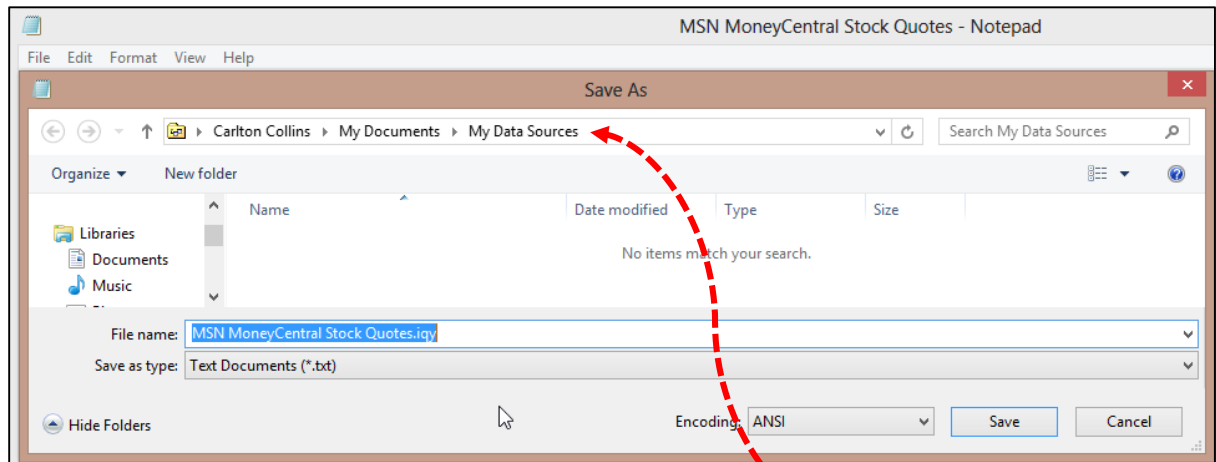
[http://moneycentral.msn.com/investor/external/excel/quotes.asp?SYMBOL=\["QUOTE","Enter stock, fund or other MSN MoneyCentral Investor symbols separated by commas."\]](http://moneycentral.msn.com/investor/external/excel/quotes.asp?SYMBOL=[)

Or if you prefer, use this to query Yahoo’s stock prices:

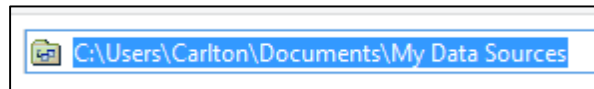


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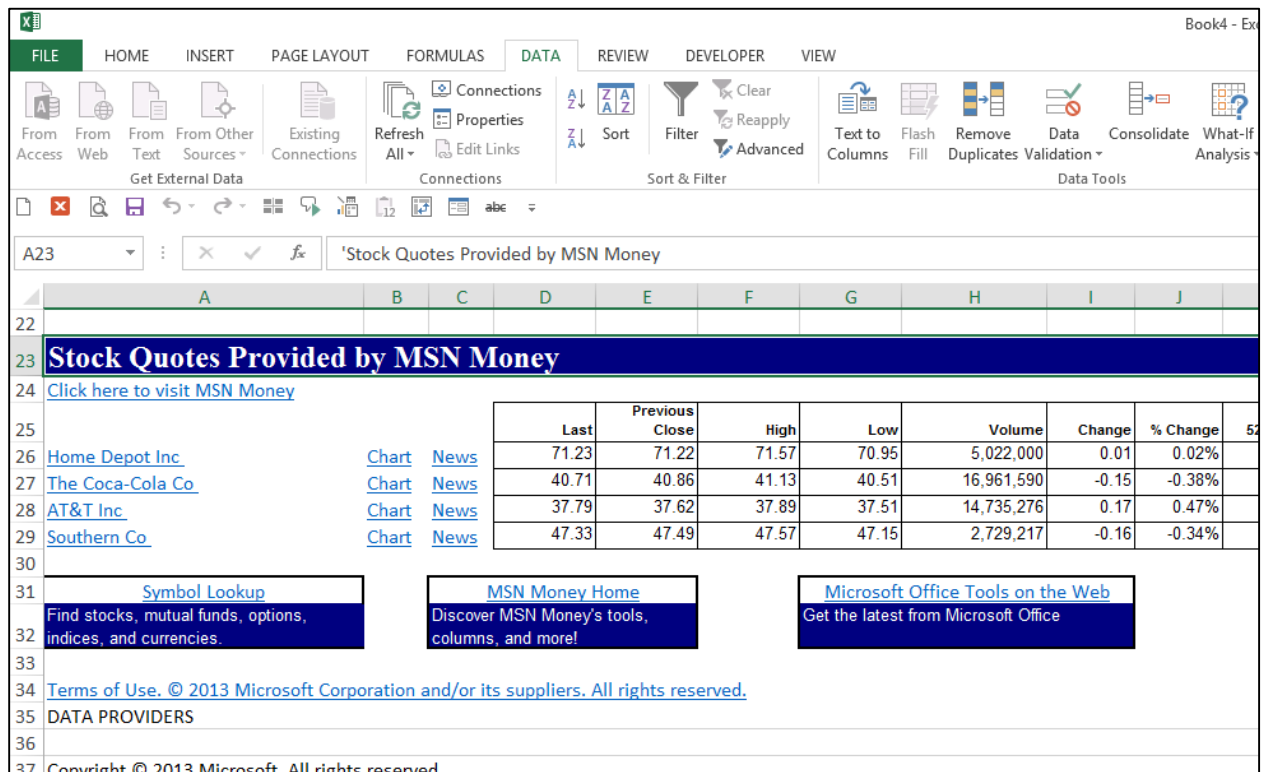
3. Save the file using any name you want, but be sure to include the extension **.igy** as pictured.



4. Make sure to save this file to the folder labeled **My Data Sources**.



5. Now in Excel, from the **Data** tab select **Existing Queries**, then scroll to and launch the new query you just created – it should work just like it did in Excel 2010, 2007 and 2003.



	Last	Previous Close	High	Low	Volume	Change	% Change	52
Home Depot Inc	71.23	71.22	71.57	70.95	5,022,000	0.01	0.02%	52
The Coca-Cola Co	40.71	40.86	41.13	40.51	16,961,590	-0.15	-0.38%	
AT&T Inc	37.79	37.62	37.89	37.51	14,735,276	0.17	0.47%	
Southern Co	47.33	47.49	47.57	47.15	2,729,217	-0.16	-0.34%	

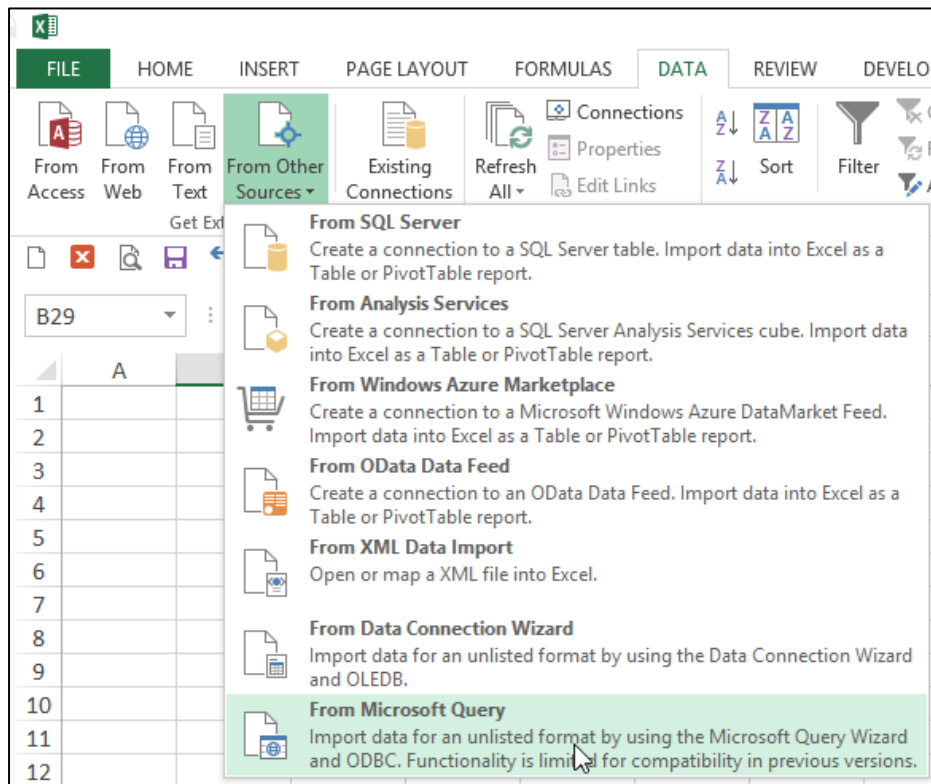
Database Queries

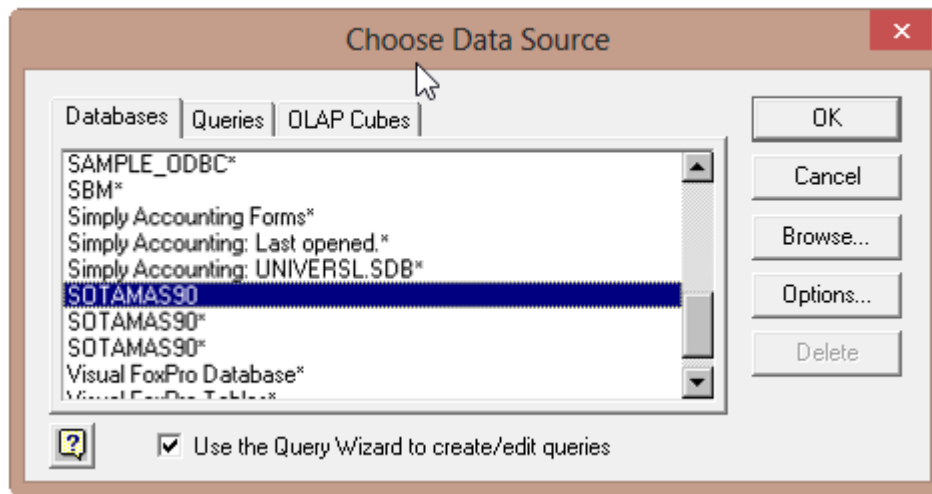
Microsoft Excel can also query and retrieve data you want from an external data source. For example, you can retrieve Microsoft Excel data about a specific product by region. You can create a simple query by using the Query Wizard, or you can create a more complex query by using the advanced features of Microsoft Query.

To use Microsoft Query to retrieve external data, you must:

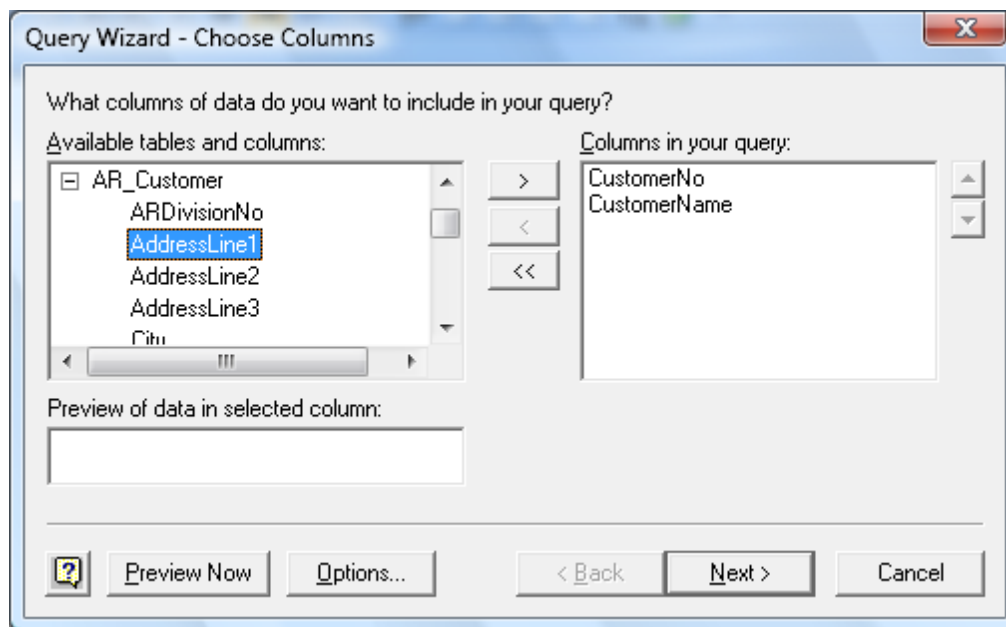
1. **Have access to an external data source** - If the data is not on your local computer, you may need to see the administrator of the external database for a password, user permission, or other information about how to connect to the database.
2. **Install Microsoft Query** - If Microsoft Query is not available, you might need to install it.
3. **Specify a source to retrieve data from, and then start using Microsoft Query** - For example, if you want to insert database information, display the Database toolbar, click Insert Database, click Get Data, and then click MS Query.

For example, suppose we have some data in our accounting system – Sage MAS 200 ERP that we would like to analyze in Excel. We can use the Database Query Wizard to build a query that will extract the data we need and place it in an Excel spreadsheet, as follows.





The first step is to select the type of database you want to query and to select the specific database.



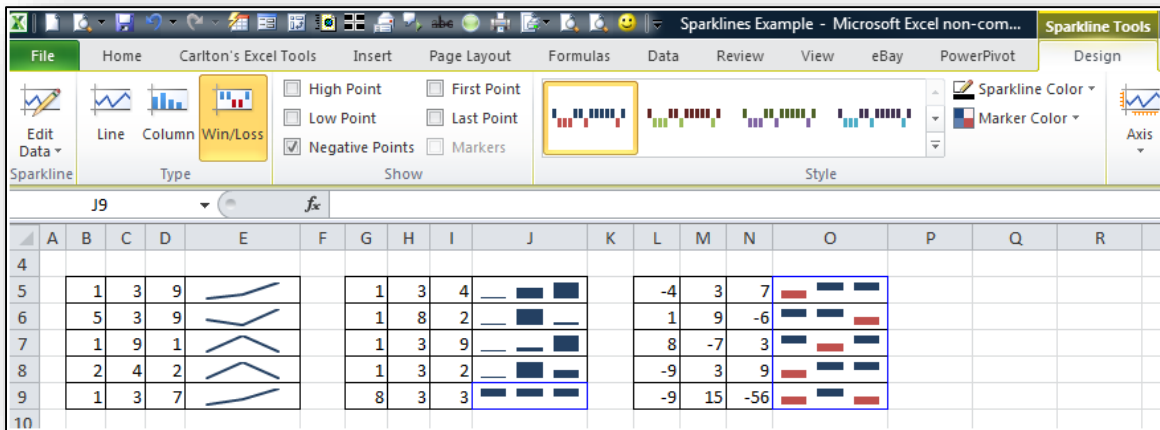
Upon the selection of the desired database a list of tables will be presented. Choose the desired tables, and select the desired data fields to be imported. You will then have the option to filter and sort the data before it is imported. Finally you will be given the option to save the query so you can run it at a later date without having to start from scratch. Excel will then return a table full of the data you requested as shown in the screen below.

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	A	B	C	D	E	F	G
1	CustomerNo	CustomerName	State	CurrentBalance	AvgDaysOverDue		
2	ABF	American Business Futures	WI	5732.36	0		
3	AVNET	Avnet Processing Corp	WI	7377.37	52		
4	BRESLIN	Breslin Parts Supply	WI	11828.26	0		
5	HILLSB	Hillsboro Service Center	WI	2902.86	0		
6	RSSUPPL	R & S Supply Corp.	WI	7086.74	0		
7	SHEPARD	Shepard Motorworks	WI	513339.95	0		
8	ALLENAP	Allen's Appliance Repair	CA	645.51	0		
9	AMERCON	American Concrete Service	CA	13743.8	57		
10	ATOZ	A To Z Carpet Supply	CA	8732.4	37		
11	AUTOOCR	Autocraft Accessories	CA	23954.02	0		
12	BAYPYRO	Bay Pyrotronics Corp.	CA	16644.94	106		
13	CAPRI	Capri Sailing Ships	CA	56169.33	31		
14	CUSTOM	Custom Craft Products	CA	19446.43	0		
15	GREALAR	Greater Alarm Company	CA	825.5	0		
16	JELCO	Jellco Packing	CA	5055.91	0		
17	ORANGE	Orange Door & Window Co.	CA	263.37	0		
18							
19							
20							

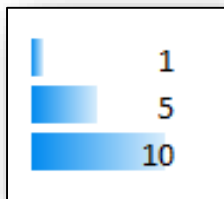
Sparklines

Sparklines – Sparklines are small cell-sized charts that you can embed in a worksheet next to data to get a quick visual representation of the data. For example, if you had a worksheet that tracked the performance of several dozen stocks, you could create a Sparkline for each stock that graphed its performance over time, in a very compact way. Here are examples:

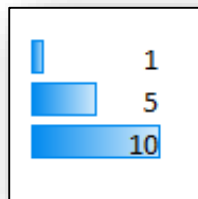


Conditional Formatting

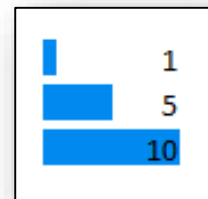
1. **Conditional Formatting Improvements** – Microsoft has improved and added more styles and icons regarding the ability to apply a format to a range of cells, and then have the formatting change according to the value of the cell or formula.
2. **Solid Bars** - Data Bars can be solid now in Excel 2010. Excel 2007 bars offered only a gradient effect, which was visually confusing to read. Below is a comparison on the Excel 2007 and Excel 2010 Data Bar options.



2007 Gradient



2010 Gradient



2010 Solid

3. **Negative Numbers** - Microsoft corrected a problem which Excel 2007 had when creating Data Bars based on negative numbers, by adding axis support for both positive and

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negative values. The screens shots below show Excel 2010's new solution, and how Excel 2007 got confused when applying Data Bars to the exact same data.

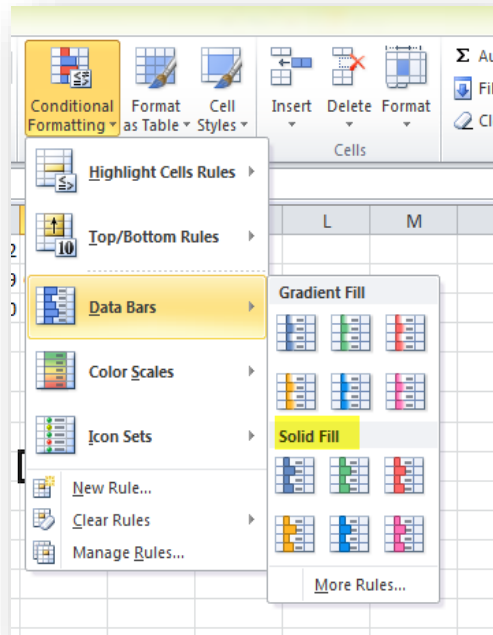
Budget	Actual	Difference	% Difference
31,800	38,765	(6,965)	-22%
1,100	940	160	15%
4,200	7,698	(3,498)	-83%
189,200	266,548	(77,348)	-41%
15,000	12,825	2,175	14%
25,400	60,511	(35,111)	-138%
4,600	3,710	890	19%
7,200	654	6,546	91%
49,800	39,501	10,300	21%
107,600	116,970	(9,370)	-9%
15,400	11,849	3,551	23%
700	900	(200)	-29%
241,600	210,103	31,498	13%
43,800	68,618	(24,818)	-57%
27,600	57,897	(30,297)	-110%

Excel 2010's Data Bars

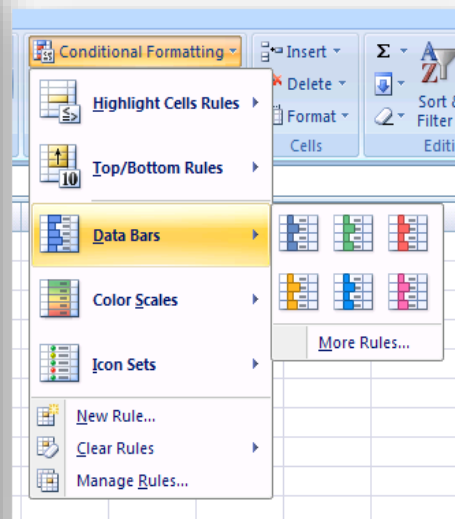
nce	% Difference
,965	-22%
160	15%
,498	-83%
,348	-41%
,175	14%
,111	-138%
890	19%
,546	91%
,300	21%
,370	-9%
,551	23%
,200	-29%
,498	13%
,818	-57%
,297	-110%

Excel 2007's Data Bars

- a. **More Data Bar Options** - Notice that Microsoft added more Data Bar options as shown in the comparison below.

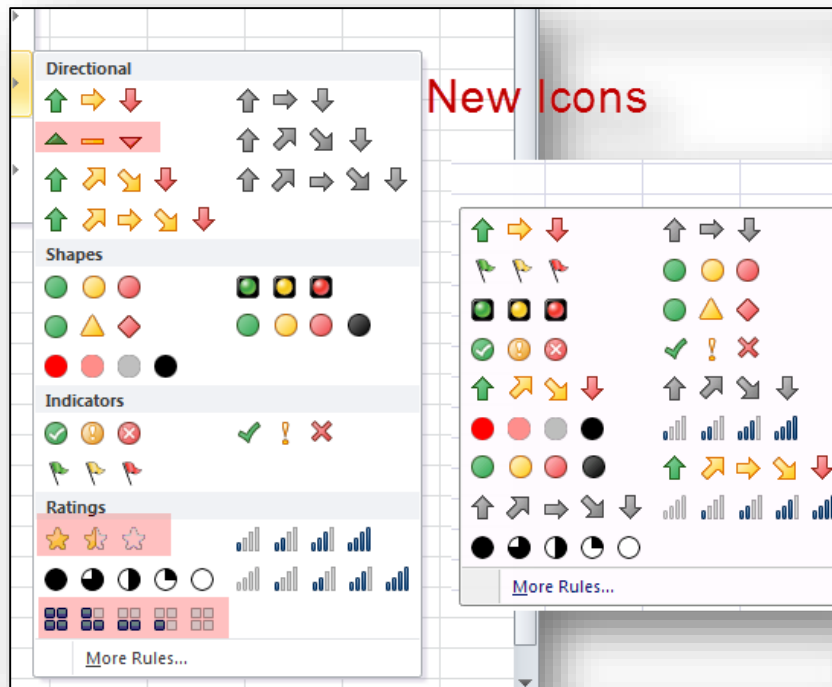


Excel 2010's Data Bar Menu



Excel 2007's Data Bar Menu

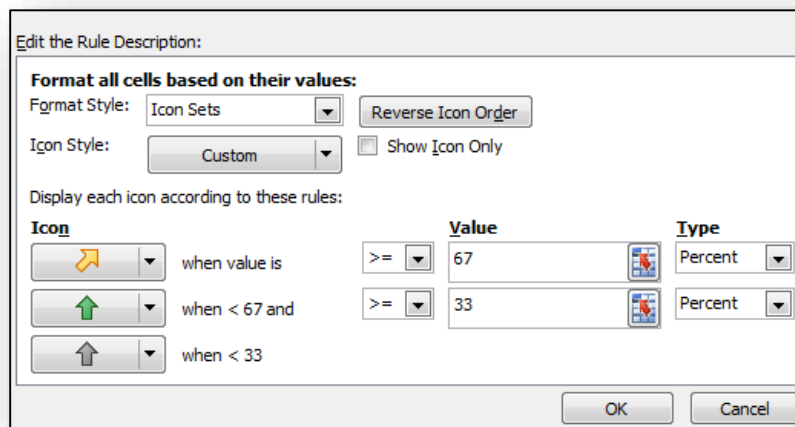
- b. **More Icon Options** - Notice that Microsoft added more Data Bar options as shown in the comparison below.



Excel 2010's Icon Menu

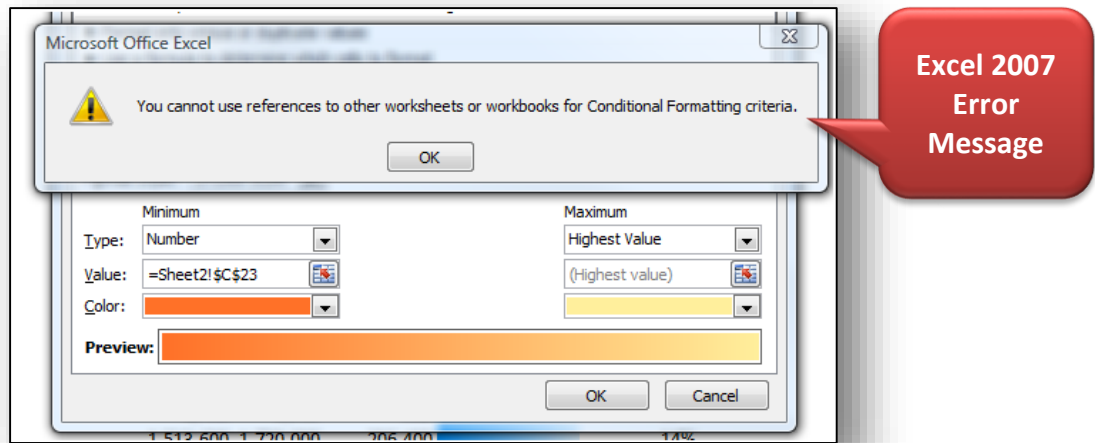
Excel 2007's Icon Menu

- c. **Arrow Colors** - It is possible to change icons used for KPI i.e. You can have two arrows with different colors that might represent both a negative impact and positive growth, for example.

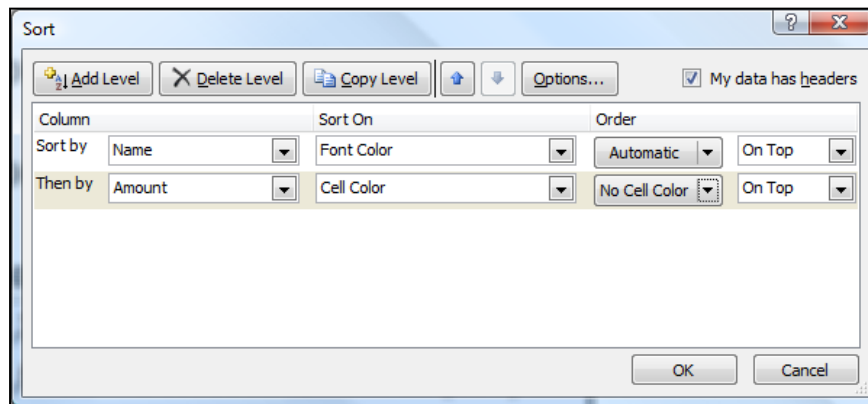


- d. **Referring to Data** - You can now refer to data on different worksheets, and even refer to a range outside the Conditional Formatting area. The screen below shows the error

message produced by Excel 2007 when you attempted to reference cells outside the Conditional Formatting area; Excel 2010 now accommodates this situation.



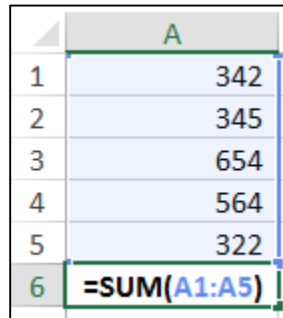
4. **Sort by Color** – Beginning with 2007, Excel provides the ability to sort by font color or by cell color, or both. This is handy in many ways. Sometimes CPAs use color to tag or mark certain cells - and later find it useful to be able to sort by those markings. In other situations CPAs use conditional formatting to apply color to cells using a wide variety of rules. Thereafter Excel can sort the data based on the resulting colors. The sort-by-color options are shown below.



To be accurate, it was possible to sort by color in Excel 2003. To accomplish this task, you needed to use the =CELL function in order to identify information about a given cell such as the cell color or font color. Thereafter, the results of that function could be used to sort rows – which effectively means that you can sort by color in Excel 2003 – but it takes a bit more effort.

Excel Functions

An Excel function is a preset formula that calculates a specific result based on the criteria/variables/arguments you specify. All functions start with the equal sign followed by the function's name and criteria/variables/arguments you specify. As a simple example, the most frequently used function in Excel is the SUM function, which is used to add data.



The image shows a screenshot of an Excel spreadsheet. The column header is 'A'. The rows contain the following values: 1 (342), 2 (345), 3 (654), 4 (564), 5 (322), and 6 (=SUM(A1:A5)).

	A
1	342
2	345
3	654
4	564
5	322
6	=SUM(A1:A5)

There are a total of 455 Excel Functions in Excel 2013; the following table summarizes the number of functions introduced in previous editions of Excel.

New Functions Added to Excel	
Excel 5.0 (1993)	First Functions Appear
Excel 5.0 thru 2001	299
Excel 2002	40
Excel 2003	0
Excel 2007	5
Excel 2010	61
Excel 2013	50
Total	455

Excel Functions are preprogrammed formulas that make the task of writing complex formulas easier. There are a total of 455 functions in Excel. These functions are separated into 14 categories as follows:

Categories & Number Of Functions In Each Category

1. Compatibility (38)
2. Cubes (7)
3. Databases (12)
4. Date and times (24)
5. Engineering (54)
6. Financials (55)
7. Information (20)
8. Logical (9)
9. Lookup and references (19)
10. Math and trigonometry (79)
11. Statistical (101)
12. Texts (30)
13. User defined that are installed with add-ins (4)
14. Webs (3)

Function Relevance to CPAs

Some Excel functions are more powerful than others and some are more relevant to the CPA than others. For example, most CPAs will find the IF, SUM, COUNT, SUBTOTAL, TEXT, and VLOOKUP are very relevant to the CPA while other engineering and trigonometry functions such as LOG, PI, RADIENS, DELTA, TAN, COMPLEX, and HAX2DEC are typically less relevant to CPAs. It has been my experience that approximately 171 functions are more relevant or important to CPAs; therefore in my opinion, CPAs wishing to increase their command of Excel functions should concentrate on learning these functions primarily. To help you accomplish this goal, presented below is a list of all 455 Excel functions, along with a brief explanation of each function. The 170 functions that I find more relevant are shown in red bold.

Compatibility

1	BETADIST	Returns the beta cumulative distribution
2	BETAINV	Returns the inverse of the cumulative distribution for a specified beta distribution
3	BINOMDIST	Returns the individual term binomial distribution probability
4	CHIDIST	Returns the one-tailed probability of the chi-squared distribution
5	CHIINV	Returns the inverse of the one-tailed probability of the chi-squared distribution
6	CHITEST	Returns the test for independence
7	CONFIDENCE	Returns the confidence interval for a population mean
8	COVAR	Returns covariance, the avg of the products of paired deviations

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9	CRITBINOM	Returns the smallest value for which the cumulative binomial distribution is less than or equal to a criterion value
10	EXPONDIST	Returns the exponential distribution
11	FDIST	Returns the F probability distribution
12	FINV	Returns the inverse of the F probability distribution
13	FTEST	Returns the result of an F-test
14	GAMMADIST	Returns the gamma distribution
15	GAMMAINV	Returns the inverse of the gamma cumulative distribution
16	HYPGEOMDIST	Returns the hypergeometric distribution
17	LOGINV	Returns the inverse of the lognormal cumulative distribution
18	LOGNORMDIST	Returns the cumulative lognormal distribution
19	MODE	Returns the most common value in a data set
20	NEGBINOMDIST	Returns the negative binomial distribution
21	NORMDIST	Returns the normal cumulative distribution
22	NORMINV	Returns the inverse of the normal cumulative distribution
23	NORMSDIST	Returns the standard normal cumulative distribution
24	NORMSINV	Returns the inverse of the standard normal cumulative distribution
25	PERCENTILE	Returns the k-th percentile of values in a range
26	PERCENTRANK	Returns the percentage rank of a value in a data set
27	POISSON	Returns the Poisson distribution
28	QUARTILE	Returns the quartile of a data set
29	RANK	Returns the rank of a number in a list of numbers
30	STDEV	Estimates standard deviation based on a sample
31	STDEVP	Calculates standard deviation based on the entire population
32	TDIST	Returns the Student's t-distribution
33	TINV	Returns the inverse of the Student's t-distribution
34	TTEST	Returns the probability associated with a Student's t-test
35	VAR	Estimates variance based on a sample
36	VARP	Calculates variance based on the entire population
37	WEIBULL	Returns the Weibull distribution
38	ZTEST	Returns the one-tailed probability-value of a z-test

Cubes

39	CUBEKPIMEMBER	Returns a key performance indicator (KPI) property and displays the KPI name in the cell. A KPI is a quantifiable measurement, such as monthly gross profit or quarterly employee turnover, that is used to monitor an organization's performance.
40	CUBEMEMBER	Returns a member or tuple from the cube. Use to validate that the member or tuple exists in the cube.

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41	CUBEMEMBERPROPERTY	Returns the value of a member property from the cube. Use to validate that a member name exists within the cube and to return the specified property for this member.
42	CUBERANKEDMEMBER	Returns the nth, or ranked, member in a set. Use to return one or more elements in a set, such as the top 10 sales performers.
43	CUBESET	Defines a calculated set of members or tuples by sending a set expression to the cube on the server, which creates the set, and then returns that set to Microsoft Office Excel.
44	CUBESETCOUNT	Returns the number of items in a set.
45	CUBEVALUE	Returns an aggregated value from the cube.

Databases

46	DAVERAGE	Returns the average of selected database entries
47	DCOUNT	Counts the cells that contain numbers in a database
48	DCOUNTA	Counts nonblank cells in a database
49	DGET	Extracts from a database a single record that matches the specified criteria
50	DMAX	Returns the maximum value from selected database entries
51	DMIN	Returns the minimum value from selected database entries
52	DPRODUCT	Multiplies the values in a particular field of records that match the criteria in a database
53	DSTDEV	Estimates standard deviation based on a sample of the database
54	DSTDEVP	Calculates the standard deviation based on the entire population of selected database entries
55	DSUM	Adds the numbers in the field column of records in the database that match the criteria
56	DVAR	Estimates variance based on a sample of the database
57	DVARP	Calculates variance based on the entire population of selected database entries

Date and Time

58	DATE	Returns the serial number of a particular date
59	DATEVALUE	Converts a date in the form of text to a serial number
60	DAY	Converts a serial number to a day of the month
61	DAYS	Returns the number of days between two dates
62	DAYS360	Calculates the number of days between two dates based on a 360-day year
63	EDATE	Returns the serial number of the date that is the indicated number of months before or after the start date
64	EOMONTH	Returns the serial number of the last day of the month before or after a specified number of months
65	HOUR	Converts a serial number to an hour

66	<u>ISOWEEKNUM</u>	Returns the number of the ISO week number of the year for a given date
67	<u>MINUTE</u>	Converts a serial number to a minute
68	<u>MONTH</u>	Converts a serial number to a month
69	<u>NETWORKDAYS</u>	Returns the number of whole workdays between two dates
70	<u>NETWORKDAYS.INTL</u>	Returns the number of whole workdays between two dates using parameters to indicate how many days are weekend days
71	<u>NOW</u>	Returns the serial number of the current date and time
72	<u>SECOND</u>	Converts a serial number to a second
73	<u>TIME</u>	Returns the serial number of a particular time
74	<u>TIMEVALUE</u>	Converts a time in the form of text to a serial number
75	<u>TODAY</u>	Returns the serial number of today's date
76	<u>WEEKDAY</u>	Converts a serial number to a day of the week
77	<u>WEEKNUM</u>	Converts a serial number to a number representing where the week falls numerically with a year
78	<u>WORKDAY</u>	Returns the serial number of the date before or after a specified number of workdays
79	<u>WORKDAY.INTL</u>	Returns the serial number of the date before or after a specified number of workdays using parameters to indicate which and how many days are weekend days
80	<u>YEAR</u>	Converts a serial number to a year
81	<u>YEARFRAC</u>	Returns the year fraction representing the number of whole days between start_date and end_date

Engineering

82	<u>BESSELI</u>	Returns the modified Bessel In(x)
83	<u>BESSELJ</u>	Returns the Bessel Jn(x)
84	<u>BESSELK</u>	Returns the modified Bessel Kn(x)
85	<u>BESSELY</u>	Returns the Bessel Yn(x)
86	<u>BIN2DEC</u>	Converts a binary number to decimal
87	<u>BIN2HEX</u>	Converts a binary number to hexadecimal
88	<u>BIN2OCT</u>	Converts a binary number to octal
89	<u>BITAND</u>	Returns a 'Bitwise And' of two numbers
90	<u>BITLSHIFT</u>	Returns a value number shifted left by shift_amount bits
91	<u>BITOR</u>	Returns a bitwise OR of 2 numbers
92	<u>BITRSHIFT</u>	Returns a value number shifted right by shift_amount bits
93	<u>BITXOR</u>	Returns a bitwise 'Exclusive Or' of two numbers
94	<u>COMPLEX</u>	Converts real and imaginary coefficients into a complex number
95	<u>CONVERT</u>	Converts a number from one measurement system to another
96	<u>DEC2BIN</u>	Converts a decimal number to binary
97	<u>DEC2HEX</u>	Converts a decimal number to hexadecimal

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98	DEC2OCT	Converts a decimal number to octal
99	DELTA	Tests whether two values are equal
100	ERF	Returns the error
101	ERF.PRECISE	Returns the error
102	ERFC	Returns the complementary error
103	ERFC.PRECISE	Returns the complementary ERF integrated between x and infinity
104	GESTEP	Tests whether a number is greater than a threshold value
105	HEX2BIN	Converts a hexadecimal number to binary
106	HEX2DEC	Converts a hexadecimal number to decimal
107	HEX2OCT	Converts a hexadecimal number to octal
108	IMABS	Returns the absolute value (modulus) of a complex number
109	IMAGINARY	Returns the imaginary coefficient of a complex number
110	IMARGUMENT	Returns the argument theta, an angle expressed in radians
111	IMCONJUGATE	Returns the complex conjugate of a complex number
112	IMCOS	Returns the cosine of a complex number
113	IMCOSH	Returns the hyperbolic cosine of a complex number
114	IMCOT	Returns the cotangent of a complex number
115	IMCSC	Returns the cosecant of a complex number
116	IMCSCH	Returns the hyperbolic cosecant of a complex number
117	IMDIV	Returns the quotient of two complex numbers
118	IMEXP	Returns the exponential of a complex number
119	IMLN	Returns the natural logarithm of a complex number
120	IMLOG10	Returns the base-10 logarithm of a complex number
121	IMLOG2	Returns the base-2 logarithm of a complex number
122	IMPOWER	Returns a complex number raised to an integer power
123	IMPRODUCT	Returns the product of from 2 to 255 complex numbers
124	IMREAL	Returns the real coefficient of a complex number
125	IMSEC	Returns the secant of a complex number
126	IMSECH	Returns the hyperbolic secant of a complex number
127	IMSIN	Returns the sine of a complex number
128	IMSINH	Returns the hyperbolic sine of a complex number
129	IMSQRT	Returns the square root of a complex number
130	IMSUB	Returns the difference between two complex numbers
131	IMSUM	Returns the sum of complex numbers
132	IMTAN	Returns the tangent of a complex number
133	OCT2BIN	Converts an octal number to binary
134	OCT2DEC	Converts an octal number to decimal
135	OCT2HEX	Converts an octal number to hexadecimal

Financial

136	<u>ACCRINT</u>	Returns accrued interest for a security paying periodic interest
137	<u>ACCRINTM</u>	Returns accrued interest for a security paying interest at maturity
138	<u>AMORDEGRC</u>	Returns the depreciation for each accounting period by using a depreciation coefficient
139	<u>AMORLINC</u>	Returns the depreciation for each accounting period
140	<u>COUPDAYBS</u>	Returns the number of days from the beginning of the coupon period to the settlement date
141	<u>COUPDAYS</u>	Returns the number of days in the coupon period that contains the settlement date
142	<u>COUPDAYSNC</u>	Returns the number of days from the settlement date to the next coupon date
143	<u>COUPNCD</u>	Returns the next coupon date after the settlement date
144	<u>COUPNUM</u>	Returns the number of coupons payable between the settlement date and maturity date
145	<u>COUPPCD</u>	Returns the previous coupon date before the settlement date
146	<u>CUMIPMT</u>	Returns the cumulative interest paid between two periods
147	<u>CUMPRINC</u>	Returns cumulative principal paid on a loan between two periods
148	<u>DB</u>	Returns the depreciation of an asset for a specified period by using the fixed-declining balance method
149	<u>DDB</u>	Returns the depreciation of an asset for a specified period by using the double-declining balance method or some other method that you specify
150	<u>DISC</u>	Returns the discount rate for a security
151	<u>DOLLARDE</u>	Converts a dollar price, expressed as a fraction, into a dollar price, expressed as a decimal number
152	<u>DOLLARFR</u>	Converts a dollar price, expressed as a decimal number, into a dollar price, expressed as a fraction
153	<u>DURATION</u>	Returns the annual duration of a security with periodic interest payments
154	<u>EFFECT</u>	Returns the effective annual interest rate
155	<u>FV</u>	Returns the future value of an investment
156	<u>FVSCHEDULE</u>	Returns the future value of an initial principal after applying a series of compound interest rates
157	<u>INTRATE</u>	Returns the interest rate for a fully invested security
158	<u>IPMT</u>	Returns interest payment for an investment for a given period
159	<u>IRR</u>	Returns the internal rate of return for a series of cash flows
160	<u>ISPMT</u>	Calculates the interest paid during a specific period of an investment
161	<u>MDURATION</u>	Returns the Macauley modified duration for a security with an assumed par value of \$100
162	<u>MIRR</u>	Returns the internal rate of return where positive and negative cash flows are financed at different rates
163	<u>NOMINAL</u>	Returns the annual nominal interest rate

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164	NPER	Returns the number of periods for an investment
165	NPV	Returns the net present value of an investment based on a series of periodic cash flows and a discount rate
166	ODDFPRICE	Returns price per \$100 face value of a security with an odd first period
167	ODDFYIELD	Returns the yield of a security with an odd first period
168	ODDLPRICE	Returns the price per \$100 face value of a security with an odd last period
169	ODDLYIELD	Returns the yield of a security with an odd last period
170	PDURATION	Returns the number of periods required by an investment to reach a specified value
171	PMT	Returns the periodic payment for an annuity
172	PPMT	Returns the payment on the principal for an investment for a given period
173	PRICE	Returns the price per \$100 face value of a security that pays periodic interest
174	PRICEDISC	Returns the price per \$100 face value of a discounted security
175	PRICEMAT	Returns the price per \$100 face value of a security that pays interest at maturity
176	PV	Returns the present value of an investment
177	RATE	Returns the interest rate per period of an annuity
178	RECEIVED	Returns the amount received at maturity for a fully invested security
179	RRI	Returns an equivalent interest rate for the growth of an investment
180	SLN	Returns the straight-line depreciation of an asset for one period
181	SYD	Returns the sum-of-years' digits depreciation of an asset for a specified period
182	TBILLEQ	Returns the bond-equivalent yield for a Treasury bill
183	TBILLPRICE	Returns the price per \$100 face value for a Treasury bill
184	TBILLYIELD	Returns the yield for a Treasury bill
185	VDB	Returns the depreciation of an asset for a specified or partial period by using a declining balance method
186	XIRR	Returns the internal rate of return for a schedule of cash flows that is not necessarily periodic
187	XNPV	Returns the net present value for a schedule of cash flows that is not necessarily periodic
188	YIELD	Returns the yield on a security that pays periodic interest
189	YIELDDISC	Returns the annual yield for a discounted security; for example, a Treasury bill
190	YIELDMAT	Returns the annual yield of a security that pays interest at maturity

Informational

191	<u>CELL</u>	Returns information about the formatting, location, or contents of a cell. Note This is not available in Excel Web App.
192	<u>ERROR.TYPE</u>	Returns a number corresponding to an error type
193	<u>INFO</u>	Returns information about the current operating environment. Note This is not available in Excel Web App.
194	<u>ISBLANK</u>	Returns TRUE if the value is blank
195	<u>ISERR</u>	Returns TRUE if the value is any error value except #N/A
196	<u>ISERROR</u>	Returns TRUE if the value is any error value
197	<u>ISEVEN</u>	Returns TRUE if the number is even
198	<u>ISFORMULA</u>	Returns TRUE if there is a reference to a cell that contains a formula
199	<u>ISLOGICAL</u>	Returns TRUE if the value is a logical value
200	<u>ISNA</u>	Returns TRUE if the value is the #N/A error value
201	<u>ISNONTEXT</u>	Returns TRUE if the value is not text
202	<u>ISNUMBER</u>	Returns TRUE if the value is a number
203	<u>ISODD</u>	Returns TRUE if the number is odd
204	<u>ISREF</u>	Returns TRUE if the value is a reference
205	<u>ISTEXT</u>	Returns TRUE if the value is text
206	<u>N</u>	Returns a value converted to a number
207	<u>NA</u>	Returns the error value #N/A
208	<u>SHEET</u>	Returns the sheet number of the referenced sheet
209	<u>SHEETS</u>	Returns the number of sheets in a reference
210	<u>TYPE</u>	Returns a number indicating the data type of a value

Logical

211	<u>AND</u>	Returns TRUE if all of its arguments are TRUE
212	<u>FALSE</u>	Returns the logical value FALSE
213	<u>IF</u>	Specifies a logical test to perform
214	<u>IFERROR</u>	Returns a value you specify if a formula evaluates to an error; otherwise, returns the result of the formula
215	<u>IFNA</u>	Returns the value you specify if the expression resolves to #N/A, otherwise returns the result of the expression
216	<u>NOT</u>	Reverses the logic of its argument
217	<u>OR</u>	Returns TRUE if any argument is TRUE
218	<u>TRUE</u>	Returns the logical value TRUE
219	<u>XOR</u>	Returns a logical exclusive OR of all arguments

Lookup and Reference

220	<u>ADDRESS</u>	Returns a reference as text to a single cell in a worksheet
221	<u>AREAS</u>	Returns the number of areas in a reference

222	<u>CHOOSE</u>	Chooses a value from a list of values
223	<u>COLUMN</u>	Returns the column number of a reference
224	<u>COLUMNS</u>	Returns the number of columns in a reference
225	<u>FORMULATEXT</u>	Returns the formula at the given reference as text
226	<u>GETPIVOTDATA</u>	Returns data stored in a PivotTable report
227	<u>HLOOKUP</u>	Looks in the top row of an array and returns the value of the indicated cell
228	<u>HYPERLINK</u>	Creates a shortcut or jump that opens a document stored on a network server, an intranet, or the Internet
229	<u>INDEX</u>	Uses an index to choose a value from a reference or array
230	<u>INDIRECT</u>	Returns a reference indicated by a text value
231	<u>LOOKUP</u>	Looks up values in a vector or array
232	<u>MATCH</u>	Looks up values in a reference or array
233	<u>OFFSET</u>	Returns a reference offset from a given reference
234	<u>ROW</u>	Returns the row number of a reference
235	<u>ROWS</u>	Returns the number of rows in a reference
236	<u>RTD</u>	Retrieves real-time data from a program that supports COM automation (Automation: A way to work with an application's objects from another application or development tool. Formerly called OLE Automation, Automation is an industry standard and a feature of the Component Object Model (COM).)
237	<u>TRANSPOSE</u>	Returns the transpose of an array
238	<u>VLOOKUP</u>	Looks in the first column of an array and moves across the row to return the value of a cell

Math & Trigonometry

239	<u>ABS</u>	Returns the absolute value of a number
240	<u>ACOS</u>	Returns the arccosine of a number
241	<u>ACOSH</u>	Returns the inverse hyperbolic cosine of a number
242	<u>ACOT</u>	Returns the arccotangent of a number
243	<u>ACOTH</u>	Returns the hyperbolic arccotangent of a number
244	<u>AGGREGATE</u>	Returns an aggregate in a list or database
245	<u>ARABIC</u>	Converts a Roman number to Arabic, as a number
246	<u>ASIN</u>	Returns the arcsine of a number
247	<u>ASINH</u>	Returns the inverse hyperbolic sine of a number
248	<u>ATAN</u>	Returns the arctangent of a number
249	<u>ATAN2</u>	Returns the arctangent from x- and y-coordinates
250	<u>ATANH</u>	Returns the inverse hyperbolic tangent of a number
251	<u>BASE</u>	Converts a number into a text representation with the given radix (base)

252	<u>CEILING</u>	Rounds a number to the nearest integer or to the nearest multiple of significance
253	<u>CEILING.MATH</u>	Rounds a number up, to the nearest integer or to the nearest multiple of significance
254	<u>CEILING.PRECISE</u>	Rounds a number the nearest integer or to the nearest multiple of significance. Regardless of the sign of the number, the number is rounded up.
255	<u>COMBIN</u>	Returns the number of combinations for a given number of objects
256	<u>COMBINA</u>	Returns the number of combinations with repetitions for a given number of items
257	<u>COS</u>	Returns the cosine of a number
258	<u>COSH</u>	Returns the hyperbolic cosine of a number
259	<u>COT</u>	Returns the cotangent of an angle
260	<u>COTH</u>	Returns the hyperbolic cotangent of a number
261	<u>CSC</u>	Returns the cosecant of an angle
262	<u>CSCH</u>	Returns the hyperbolic cosecant of an angle
263	<u>DECIMAL</u>	Converts a text representation of a number in a given base into a decimal number
264	<u>DEGREES</u>	Converts radians to degrees
265	<u>EVEN</u>	Rounds a number up to the nearest even integer
266	<u>EXP</u>	Returns e raised to the power of a given number
267	<u>FACT</u>	Returns the factorial of a number
268	<u>FACTDOUBLE</u>	Returns the double factorial of a number
269	<u>FLOOR</u>	Rounds a number down, toward zero
270	<u>FLOOR.MATH</u>	Rounds a number down, to the nearest integer or to the nearest multiple of significance
271	<u>FLOOR.PRECISE</u>	Rounds a number down to the nearest integer or to the nearest multiple of significance. Regardless of the sign of the number, the number is rounded down.
272	<u>GCD</u>	Returns the greatest common divisor
273	<u>INT</u>	Rounds a number down to the nearest integer
274	<u>ISO.CEILING</u>	Returns a number that is rounded up to the nearest integer or to the nearest multiple of significance
275	<u>LCM</u>	Returns the least common multiple
276	<u>LN</u>	Returns the natural logarithm of a number
277	<u>LOG</u>	Returns the logarithm of a number to a specified base
278	<u>LOG10</u>	Returns the base-10 logarithm of a number
279	<u>MDETERM</u>	Returns the matrix determinant of an array
280	<u>MINVERSE</u>	Returns the matrix inverse of an array
281	<u>MMULT</u>	Returns the matrix product of two arrays
282	<u>MOD</u>	Returns the remainder from division
283	<u>MROUND</u>	Returns a number rounded to the desired multiple

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284	MULTINOMIAL	Returns the multinomial of a set of numbers
285	MUNIT	Returns the unit matrix or the specified dimension
286	ODD	Returns a number up to the nearest odd integer
287	PI	Returns the value of pi
288	POWER	Returns the result of a number raised to a power
289	PRODUCT	Multiplies its arguments
290	QUOTIENT	Returns the integer portion of a division
291	RADIANS	Converts degrees to radians
292	RAND	Returns a random number between 0 and 1
293	RANDBETWEEN	Returns a random number between the numbers you specify
294	ROMAN	Converts an Arabic numeral to Roman, as text
295	ROUND	Rounds a number to a specified number of digits
296	ROUNDDOWN	Rounds a number down, toward zero
297	ROUNDUP	Rounds a number up, away from zero
298	SEC	Returns the secant of an angle
299	SECH	Returns the hyperbolic secant of an angle
300	SERIESSUM	Returns the sum of a power series based on the formula
301	SIGN	Returns the sign of a number
302	SIN	Returns the sine of the given angle
303	SINH	Returns the hyperbolic sine of a number
304	SQRT	Returns a positive square root
305	SQRTPI	Returns the square root of (number * pi)
306	SUBTOTAL	Returns a subtotal in a list or database
307	SUM	Adds its arguments
308	SUMIF	Adds the cells specified by a given criteria
309	SUMIFS	Adds the cells in a range that meet multiple criteria
310	SUMPRODUCT	Returns the sum of the products of corresponding array components
311	SUMSQ	Returns the sum of the squares of the arguments
312	SUMX2MY2	Returns the sum of the difference of squares of corresponding values in two arrays
313	SUMX2PY2	Returns the sum of the sum of squares of corresponding values in two arrays
314	SUMXMY2	Returns the sum of squares of differences of corresponding values in two arrays
315	TAN	Returns the tangent of a number
316	TANH	Returns the hyperbolic tangent of a number
317	TRUNC	Truncates a number to an integer

Statistical

318	AVEDEV	Returns the average of the absolute deviations of data points from their mean
319	AVERAGE	Returns the average of its arguments
320	AVERAGEA	Returns the average of its arguments, including numbers, text, and logical values
321	AVERAGEIF	Returns the average (arithmetic mean) of all the cells in a range that meet a given criteria
322	AVERAGEIFS	Returns the average (arithmetic mean) of all cells that meet multiple criteria
323	BETA.DIST	Returns the beta cumulative distribution
324	BETA.INV	Returns the inverse of the cumulative distribution for a specified beta distribution
325	BINOM.DIST	Returns the individual term binomial distribution probability
326	BINOM.DIST.RANGE	Returns the probability of a trial result using a binomial distribution
327	BINOM.INV	Returns the smallest value for which the cumulative binomial distribution is less than or equal to a criterion value
328	CHISQ.DIST	Returns the cumulative beta probability density
329	CHISQ.DIST.RT	Returns the one-tailed probability of the chi-squared distribution
330	CHISQ.INV	Returns the cumulative beta probability density
331	CHISQ.INV.RT	Returns the inverse of the one-tailed probability of the chi-squared distribution
332	CHISQ.TEST	Returns the test for independence
333	CONFIDENCE.NORM	Returns the confidence interval for a population mean
334	CONFIDENCE.T	Returns the confidence interval for a population mean, using a Student's t distribution
335	CORREL	Returns the correlation coefficient between two data sets
336	COUNT	Counts how many numbers are in the list of arguments
337	COUNTA	Counts how many values are in the list of arguments
338	COUNTBLANK	Counts the number of blank cells within a range
339	COUNTIF	Counts the number of cells within a range that meet the given criteria
340	COUNTIFS	Counts the number of cells within a range that meet multiple criteria
341	COVARIANCE.P	Returns covariance, the average of the products of paired deviations
342	COVARIANCE.S	Returns the sample covariance, the average of the products deviations for each data point pair in two data sets
343	DEVSQ	Returns the sum of squares of deviations
344	EXPON.DIST	Returns the exponential distribution
345	F.DIST	Returns the F probability distribution
346	F.DIST.RT	Returns the F probability distribution
347	F.INV	Returns the inverse of the F probability distribution

348	F.INV.RT	Returns the inverse of the F probability distribution
349	F.TEST	Returns the result of an F-test
350	FISHER	Returns the Fisher transformation
351	FISHERINV	Returns the inverse of the Fisher transformation
352	FORECAST	Returns a value along a linear trend
353	FREQUENCY	Returns a frequency distribution as a vertical array
354	GAMMA	Returns the Gamma value
355	GAMMA.DIST	Returns the gamma distribution
356	GAMMA.INV	Returns the inverse of the gamma cumulative distribution
357	GAMMALN	Returns the natural logarithm of the gamma, $\Gamma(x)$
358	GAMMALN.PRECISE	Returns the natural logarithm of the gamma, $\Gamma(x)$
359	GAUSS	Returns 0.5 less than the standard normal cumulative distribution
360	GEOMEAN	Returns the geometric mean
361	GROWTH	Returns values along an exponential trend
362	HARMEAN	Returns the harmonic mean
363	HYPGEOM.DIST	Returns the hypergeometric distribution
364	INTERCEPT	Returns the intercept of the linear regression line
365	KURT	Returns the kurtosis of a data set
366	LARGE	Returns the k-th largest value in a data set
367	LINEST	Returns the parameters of a linear trend
368	LOGEST	Returns the parameters of an exponential trend
369	LOGNORM.DIST	Returns the cumulative lognormal distribution
370	LOGNORM.INV	Returns the inverse of the lognormal cumulative distribution
371	MAX	Returns the maximum value in a list of arguments
372	MAXA	Returns the maximum value in a list of arguments, including numbers, text, and logical values
373	MEDIAN	Returns the median of the given numbers
374	MIN	Returns the minimum value in a list of arguments
375	MINA	Returns the smallest value in a list of arguments, including numbers, text, and logical values
376	MODE.MULT	Returns a vertical array of the most frequently occurring, or repetitive values in an array or range of data
377	MODE.SNGL	Returns the most common value in a data set
378	NEGBINOM.DIST	Returns the negative binomial distribution
379	NORM.DIST	Returns the normal cumulative distribution
380	NORM.INV	Returns the inverse of the normal cumulative distribution
381	NORM.S.DIST	Returns the standard normal cumulative distribution
382	NORM.S.INV	Returns the inverse of the standard normal cumulative distribution
383	PEARSON	Returns the Pearson product moment correlation coefficient
384	PERCENTILE.EXC	Returns the k-th percentile of values in a range, where k is in the range 0..1, exclusive

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385	PERCENTILE.INC	Returns the k-th percentile of values in a range
386	PERCENTRANK.EXC	Returns the rank of a value in a data set as a percentage (0..1, exclusive) of the data set
387	PERCENTRANK.INC	Returns the percentage rank of a value in a data set
388	PERMUT	Returns the number of permutations for a given number of objects
389	PERMUTATIONA	Returns the number of permutations for a given number of objects (with repetitions) that can be selected from the total objects
390	PHI	Returns the value of the density for a standard normal distribution
391	POISSON.DIST	Returns the Poisson distribution
392	PROB	Returns the probability that values in a range are between two limits
393	QUARTILE.EXC	Returns the quartile of the data set, based on percentile values from 0..1, exclusive
394	QUARTILE.INC	Returns the quartile of a data set
395	RANK.AVG	Returns the rank of a number in a list of numbers
396	RANK.EQ	Returns the rank of a number in a list of numbers
397	RSQ	Returns the square of the Pearson product moment correlation coefficient
398	SKEW	Returns the skewness of a distribution
399	SKEW.P	Returns the skewness of a distribution based on a population: a characterization of the degree of asymmetry of a distribution around its mean
400	SLOPE	Returns the slope of the linear regression line
401	SMALL	Returns the k-th smallest value in a data set
402	STANDARDIZE	Returns a normalized value
403	STDEV.P	Calculates standard deviation based on the entire population
404	STDEV.S	Estimates standard deviation based on a sample
405	STDEVA	Estimates standard deviation based on a sample, including numbers, text, and logical values
406	STDEVPA	Calculates standard deviation based on the entire population, including numbers, text, and logical values
407	STEYX	Returns the standard error of the predicted y-value for each x in the regression
408	T.DIST	Returns the Percentage Points (probability) for the Student t-distribution
409	T.DIST.2T	Returns the Percentage Points (probability) for the Student t-distribution
410	T.DIST.RT	Returns the Student's t-distribution
411	T.INV	Returns the t-value of the Student's t-distribution as a of the probability and the degrees of freedom
412	T.INV.2T	Returns the inverse of the Student's t-distribution
413	T.TEST	Returns the probability associated with a Student's t-test
414	TREND	Returns values along a linear trend

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415	TRIMMEAN	Returns the mean of the interior of a data set
416	VAR.P	Calculates variance based on the entire population
417	VAR.S	Estimates variance based on a sample
418	VARA	Estimates variance based on a sample, including numbers, text, and logical values
419	VARPA	Calculates variance based on the entire population, including numbers, text, and logical values
420	WEIBULL.DIST	Returns the Weibull distribution
421	Z.TEST	Returns the one-tailed probability-value of a z-test



Text

422	ASC	Changes full-width (double-byte) English letters or katakana within a character string to half-width (single-byte) characters
423	BAHTTEXT	Converts a number to text, using the ฿ (baht) currency format
424	CHAR	Returns the character specified by the code number
425	CLEAN	Removes all nonprintable characters from text
426	CODE	Returns a numeric code for the first character in a text string
427	CONCATENATE	Joins several text items into one text item
428	DBCS	Changes half-width (single-byte) English letters or katakana within a character string to full-width (double-byte) characters
429	DOLLAR	Converts a number to text, using the \$ (dollar) currency format
430	EXACT	Checks to see if two text values are identical
431	FIND, FINDBs	Finds one text value within another (case-sensitive)
432	FIXED	Formats a number as text with a fixed number of decimals
433	LEFT, LEFTBs	Returns the leftmost characters from a text value
434	LEN, LENBs	Returns the number of characters in a text string
435	LOWER	Converts text to lowercase
436	MID, MIDBs	Returns a specific number of characters from a text string starting at the position you specify
437	NUMBERVALUE	Converts text to number in a locale-independent manner
438	PHONETIC	Extracts the phonetic (furigana) characters from a text string
439	PROPER	Capitalizes the first letter in each word of a text value
440	REPLACE, REPLACEBs	Replaces characters within text
441	REPT	Repeats text a given number of times
442	RIGHT, RIGHTBs	Returns the rightmost characters from a text value
443	SEARCH, SEARCHBs	Finds one text value within another (not case-sensitive)
444	SUBSTITUTE	Substitutes new text for old text in a text string
445	T	Converts its arguments to text
446	TEXT	Formats a number and converts it to text
447	TRIM	Removes spaces from text

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448	UNICHAR	Returns the Unicode character that is references by the given numeric value
449	UNICODE	Returns the number (code point) that corresponds to the first character of the text
450	UPPER	Converts text to uppercase
451	VALUE	Converts a text argument to a number

User defined that are installed with add-ins

452	CALL	Calls a procedure in a dynamic link library or code resource
453	EUROCONVERT	Converts a number to euros, converts a number from euros to a euro member currency, or converts a number from one euro member currency to another by using the euro as an intermediary (triangulation)
454	REGISTER.ID	Returns the register ID of the specified dynamic link library (DLL) or code resource that has been previously registered
455	SQL.REQUEST	Connects with an external data source and runs a query from a worksheet, then returns the result as an array without the need for macro programming

Web

453	ENCODEURL	Returns a URL-encoded string
454	FILTERXML	Returns specific data from the XML content by using the specified XPath
455	WEBSERVICE	

The 171 Most Relevant and Important Functions to CPAs (According to Carlton's best guess)

*The numbers in parenthesis correspond to the order
in which each function appears on the All Functions worksheet*

Open an Excel file Containing Function Examples:
<http://www.ASAResearch.com/web/functions.xlsx>

The goal of this summary is to help CPAs focus on learning the most relevant and important functions first, without having to waste time wading through all 455 functions. Excel 2013 provides 455 functions, but in most cases only 37.5% of them are relevant and important to CPAs. Consider, how often do you expect to use the CRITBINOMIALDIST function? How often will the IMAGINARY function have relevance to your work? When did any CPA ever calculate depreciation using the SYD method (other than on a CPA example question). The reality is that CPAs don't have to know all of the functions to master Excel, you'll conquer Excel just by learning 37.5% of the included functions.

1. IF (213) - Specifies a logical test to perform.
2. SUM (307) - Adds its arguments.
3. SUBTOTAL (306) - Returns a subtotal in a list or database.
4. SUMIF (308) - Adds the cells specified by a given criteria.
5. COUNT (336) - Counts how many numbers are in the list of arguments.
6. COUNTA (337) - Counts how many values are in the list of arguments.
7. AVERAGE (319) - Returns the average of its arguments.
8. COUNTBLANK (338) - Counts the number of blank cells within a range.
9. COUNTIF (339) - Counts the number of cells within a range that meet the given criteria.
10. VALUE (451) - Converts a text argument to a number.
11. TEXT (446) - Formats a number and converts it to text.
12. VLOOKUP (238) - Looks in the first column of an array and moves across the row to return the value of the indicated cell.
13. HLOOKUP (227) - Looks in the top row of an array and returns the value of the indicated cell.
14. TWO WAY LOOKUP – Using both VLOOKUP and HLOOKUP together.
15. LOOKUP (231) - Looks up values in a vector or array.
16. MATCH (232) - Looks up values in a reference or array.
17. TRIM (447) - Removes spaces from text.
18. PROPER (439) - Capitalizes the first letter in each word of a text value.
19. LOWER (435) - Converts text to lowercase.
20. UPPER (450) - Converts text to uppercase.

21. LEFT, LEFTBs (433) - Returns the leftmost characters from a text value.
22. RIGHT, RIGHTBs (442) - Returns the rightmost characters from a text value.
23. MID, MIDBs (436) - Returns a specific number of characters from a text string starting at the position.
24. FIND, FINDBs (431) - Finds one text value within another (case-sensitive).
25. SUBSTITUTE (444) - Substitutes new text for old text in a text string.
26. LEN, LENBs (434) - Returns the number of characters in a text string.
27. REPLACE, REPLACEBs (440) - Replaces characters within text.
28. CONCATENATE (427) - Joins several text items into one text item.
29. CLEAN (425) - Removes all nonprintable characters from text.
30. NOW (71) - Returns the serial number of the current date and time.
31. TODAY (75) - Returns the serial number of today's date.
32. DATE (58) - Returns the serial number of a particular date.
33. MONTH (68) - Converts a serial number to a month.
34. DAY (60) - Converts a serial number to a day of the month.
35. YEAR (80) - Converts a serial number to a year.
36. WEEKDAY (76) - Converts a serial number to a day of the week.
37. ROUND (295) - Rounds a number to a specified number of digits.
38. ROUNDDOWN (296) - Rounds a number down, toward zero.
39. ROUNDUP (297) - Rounds a number up, away from zero.
40. MAX (371) - Returns the maximum value in a list of arguments.
41. DMAX (50) - Returns the maximum value from selected database entries.
42. MIN (374) - Returns the minimum value in a list of arguments.
43. DMIN (51) - Returns the minimum value from selected database entries.
44. MEDIAN - Returns the median of the given numbers.
45. MODE - Returns the most common value in a data set.
46. PERCENTILE (25) - Returns the k-th percentile of values in a range.
47. PERCENTRANK (26) - Returns the percentage rank of a value in a data set.
48. PMT (171) - Returns the periodic payment for an annuity.
49. NPV (165) - Returns the net present value of an investment based on a series of periodic cash flows.
50. DSUM (55) - Adds the numbers in the field column of records in the database that match the criteria.
51. DCOUNT (47) - Counts the cells that contain numbers in a database.
52. DCOUNTA (48) - Counts nonblank cells in a database.
53. AND (211) - Returns TRUE if all of its arguments are TRUE.
54. OR (217) - Returns TRUE if any argument is TRUE.
55. CHOOSE (222) - Chooses a value from a list of values.

56. TIME (73) - Returns the serial number of a particular time.
57. FV (155) - Returns the future value of an investment.
58. IRR (159) - Returns the internal rate of return for a series of cash flows.
59. YIELD (188) - Returns the yield on a security that pays periodic interest.
60. CELL (191) - Returns information about the formatting, location, or contents of a cell. Note
61. INFO (193) - Returns information about the current operating environment. Note This is not avail.
62. ERROR.TYPE (192) - Returns a number corresponding to an error type.
63. ISBLANK (194) - Returns TRUE if the value is blank.
64. ISNA (200) - Returns TRUE if the value is the #N/A error value.
65. GETPIVOTDATA (226) - Returns data stored in a PivotTable report.
66. HYPERLINK (228) - Creates a shortcut or jump that opens a document stored on a network server, an in.
67. TRANSPOSE (237) - Returns the transpose of an array.
68. ABS (239) - Returns the absolute value of a number.
69. RAND (292) - Returns a random number between 0 and 1.
70. RANDBETWEEN (293) - Returns a random number between the numbers you specify.
71. REPT (441) - Repeats text a given number of times.
72. SLN (180) - Returns the straight-line depreciation of an asset for one period.
73. SYD - Returns the sum-of-years' digits depreciation of an asset for a specified period.
74. DDB (149) - Returns the depreciation of an asset for a specified period by using the double-declining balance method.
75. DGET (49) - Extracts from a database a single record that matches the specified criteria.
76. ADDRESS (220) - Returns a reference as text to a single cell in a worksheet.
77. AGGREGATE (244) - Returns an aggregate in a list or database.
78. FORECAST (352) - Returns a value along a linear trend.
79. GROWTH (361) - Returns values along an exponential trend.
80. LARGE (366) - Returns the k-th largest value in a data set.
81. NOT (216) - Reverses the logic of its argument.
82. OFFSET (233) - Returns a reference offset from a given reference.
83. PEARSON (383) - Returns the Pearson product moment correlation coefficient.
84. PV (176) - Returns the present value of an investment.
85. RATE (177) - Returns the interest rate per period of an annuity.
86. SEARCH, SEARCHBs (443) - Finds one text value within another (not case-sensitive).
87. SMALL (401) - Returns the k-th smallest value in a data set.
88. XIRR (186) - Returns the internal rate of return for a schedule of cash flows that is not necessarily.

89. XOR (219) - Returns a logical exclusive OR of all arguments.
90. AVERAGEIF (321) - Returns the average (arithmetic mean) of all the cells in a range that meet a give.
91. AVERAGEIFS (322) - Returns the average (arithmetic mean) of all cells that meet multiple criteria.
92. COLUMN (223) - Returns the column number of a reference.
93. COLUMNS (224) - Returns the number of columns in a reference.
94. CONVERT (95) - Converts a number from one measurement system to another.
95. COUNTIFS (340) - Counts the number of cells within a range that meet multiple criteria.
96. DATEVALUE (59) - Converts a date in the form of text to a serial number.
97. DECIMAL (263) - Converts a text representation of a number in a given base into a decimal number.
98. DOLLAR (429) - Converts a number to text, using the \$ (dollar) currency format.
99. EXACT (430) - Checks to see if two text values are identical.
100. FORMULATEXT (225) - Returns the formula at the given reference as text.
101. HOUR (65) - Converts a serial number to an hour.
102. INDEX (229) - Uses an index to choose a value from a reference or array.
103. ISERR (195) - Returns TRUE if the value is any error value except #N/A.
104. ISERROR (196) - Returns TRUE if the value is any error value.
105. ISFORMULA (198) - Returns TRUE if there is a reference to a cell that contains a formula.
106. KURT (365) - Returns the kurtosis of a data set.
107. MINUTE (67) - Converts a serial number to a minute.
108. NA (207) - Returns the error value #N/A.
109. PPMT (172) - Returns the payment on the principal for an investment for a given period.
110. ROW (234) - Returns the row number of a reference.
111. ROWS (235) - Returns the number of rows in a reference.
112. RSQ (397) - Returns the square of the Pearson product moment correlation coefficient.
113. SHEET (208) - Returns the sheet number of the referenced sheet.
114. SHEETS (209) - Returns the number of sheets in a reference.
115. SKEW (398) - Returns the skewness of a distribution.
116. SKEW.P (399) - Returns the skewness of a distribution based on a population: a characterization of t.
117. SUMIFS (309) - Adds the cells in a range that meet multiple criteria.
118. T (445) - Converts its arguments to text.
119. TYPE (210) - Returns a number indicating the data type of a value.
120. WEEKNUM (77) - Converts a serial number to a number representing where the week falls numerically with a year.

121. WORKDAY (78) - Returns the serial number of the date before or after a specified number of workdays.
122. XNPV (187) - Returns the net present value for a schedule of cash flows that is not necessarily periodic.
123. EFFECT (154) - Returns the effective annual interest rate.
124. INT (273) - Rounds a number down to the nearest integer.
125. INTERCEPT (364) - Returns the intercept of the linear regression line.
126. RANK (29) - Returns the rank of a number in a list of numbers.
127. RRI (179) - Returns an equivalent interest rate for the growth of an investment.
128. SIGN (301) - Returns the sign of a number.
129. SLOPE (400) - Returns the slope of the linear regression line.
130. CEILING (252) - Rounds a number to the nearest integer or to the nearest multiple of significance.
131. CEILING.MATH (253) - Rounds a number up, to the nearest integer or to the nearest multiple of significance.
132. CHAR (424) - Returns the character specified by the code number.
133. CODE (426) - Returns a numeric code for the first character in a text string.
134. DAVERAGE (46) - Returns the average of selected database entries.
135. DAYS (61) - Returns the number of days between two dates.
136. FALSE (212) - Returns the logical value FALSE.
137. FIXED (432) - Formats a number as text with a fixed number of decimals.
138. FLOOR.MATH (270) - Rounds a number down, to the nearest integer or to the nearest multiple of significance .
139. IFERROR (214) - Returns a value you specify if a formula evaluates to an error; otherwise, returns t.
140. IFNA (215) - Returns the value you specify if the expression resolves to #N/A, otherwise returns the.
141. INDIRECT (230) - Returns a reference indicated by a text value.
142. IPMT (158) - Returns the interest payment for an investment for a given period.
143. ISNONTEXT (201) - Returns TRUE if the value is not text.
144. ISNUMBER (202) - Returns TRUE if the value is a number.
145. MAXA (372) - Returns the maximum value in a list of arguments, including numbers, text, and logical .
146. MINA (375) - Returns the smallest value in a list of arguments, including numbers, text, and logical.
147. N (206) - Returns a value converted to a number.
148. NETWORKDAYS (69) - Returns the number of whole workdays between two dates.
149. RECEIVED (178) - Returns the amount received at maturity for a fully invested security.

- 150. SECOND (72) - Converts a serial number to a second.
- 151. SUMPRODUCT (310) - Returns the sum of the products of corresponding array components.
- 152. TREND (414) - Returns values along a linear trend.
- 153. TRUE (218) - Returns the logical value TRUE.
- 154. ACCRINT (136) - Returns the accrued interest for a security that pays periodic interest.
- 155. ACCRINTM (137) - Returns the accrued interest for a security that pays interest at maturity.
- 156. ISPMT (160) - Calculates the interest paid during a specific period of an investment.
- 157. ISTEXT (205) - Returns TRUE if the value is text.
- 158. LINEST (367) - Returns the parameters of a linear trend.
- 159. CUBEKPIMEMBER (39) - Returns a key performance indicator (KPI) property and displays the KPI name in.
- 160. DELTA (99) - Tests whether two values are equal.
- 161. EVEN (265) - Rounds a number up to the nearest even integer.
- 162. ISEVEN (197) - Returns TRUE if the number is even.
- 163. ISODD (203) - Returns TRUE if the number is odd.
- 164. ISOWEEKNUM (66) - Returns the number of the ISO week number of the year for a given date.
- 165. LOGEST (368) - Returns the parameters of an exponential trend.
- 166. ODD (286) - Rounds a number up to the nearest odd integer.
- 167. PRODUCT (289) - Multiplies its arguments.
- 168. QUOTIENT (290) - Returns the integer portion of a division.
- 169. STDEVP (31) - Calculates standard deviation based on the entire population.
- 170. TBILLEQ (182) - Returns the bond-equivalent yield for a Treasury bill.
- 171. TBILLYIELD (184) - Returns the yield for a Treasury bill.
- 172. TIMEVALUE (74) - Converts a time in the form of text to a serial number.



Bio for J. Carlton Collins, CPA

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J. Carlton Collins, CPA is a Certified Public Accountant with experience in technology, tax, auditing, accounting systems, financial reporting, and bond financing. He is an author, lecturer, and technology & accounting systems consultant. He has published books, articles, and web pages and is the author of the monthly technology Q&A column for the **Journal of Accountancy**. As a public speaker, Mr. Collins has delivered more than 2,000 lectures in 44 states and 5 countries addressing more than 500,000 CPAs and business professionals. As a consultant, Mr. Collins has assisted 275+ large and small companies with the selection and implementation of accounting systems. Mr. Collins has a Bachelor's degree in Accounting from the University of Georgia, is a 25+ year member of the American Institute of CPAs and the Georgia Society of CPAs.

Summary of Selected Positions, Awards & Accomplishments:

1. Honored as one of the CPA Industries Top 25 Thought Leaders by **CPA Technology Advisor Magazine**
2. Author of the monthly Technology Q&A column for the Journal of Accountancy.
3. Recipient of the AICPA's Lifetime Technical Contribution to the CPA Profession Award.
4. Chairman of the Southeast Accounting Show - the South's largest CPA event.
5. Recipient of the Tom Radcliff Outstanding Discussion Leader Award.
6. Named "Top Ten CPA Technologists" by Accounting Technologies Magazine (multiple years).
7. Named "Top 100 Most Influential CPAs" by Accounting Technologies Magazine (multiple years).
8. Has personally delivered over 2,000 technology lectures around the world.
9. Recipient of the Outstanding Discussion Leader Award from the Georgia Society of CPAs.
10. Lead author for PPC's Guide to Installing Microcomputer Accounting Systems.
11. Has installed accounting systems for more than 200 companies.
12. Chairperson of the AICPA Technology Conference.
13. Recipient of the ACCPAC Partner of the Year Award.
14. Determined by SAP to be one of the country's "Top Ten Most Influential ERP Systems Consultants".
15. Has delivered keynote and session lectures at dozens of accounting software conferences.
16. Sworn in as a Certified Public Accountant on September 18, 1985.
17. Member of the American Institute of CPAs since 1985.
18. Member of the Georgia Society of CPAs since 1982.

As an auditor, Mr. Collins has audited businesses in the areas of health care, construction, distribution, automobile dealerships, insurance, manufacturing, and general business. Mr. Collins' tax experience includes corporate, individual, partnership, fiduciary, and estate tax planning work. In the area of finance, Mr. Collins has prepared (or assisted in preparing) feasibility studies and financial forecasts for nearly 300 projects seeking more than \$3 billion in startup capital. Mr. Collins is familiar with bond issues, Medicare and Medicaid reimbursement, and conventional financing matters. In 1992, Mr. Collins contributed and demonstrated more than 500 pages of suggested design improvements to the Microsoft Excel development team of programmers - and many of those improvements are found in Excel today.

At the University of Georgia, Mr. Collins was elected President of the Phi Eta Sigma Honor Society, was initiated into the BIFTAD Honor Society, served three years in the Judicial Defender/Advocate program, and was a member of Alpha Tau Omega fraternity. At Glynn Academy High School, Mr. Collins was Senior Class President, Class Valedictorian (1 of 6), and received a principle nomination to Annapolis Naval Academy. Mr. Collins has been married for 27 years and has two children. He devotes his leisure time to family, travel, tennis, fishing, snow skiing, and riding motorcycles (both dirt and street). Mr. Collins is president of his homeowners association, participates in the Gwinnett Clean and Beautiful program, and volunteers for Cooperative Ministries food drive.