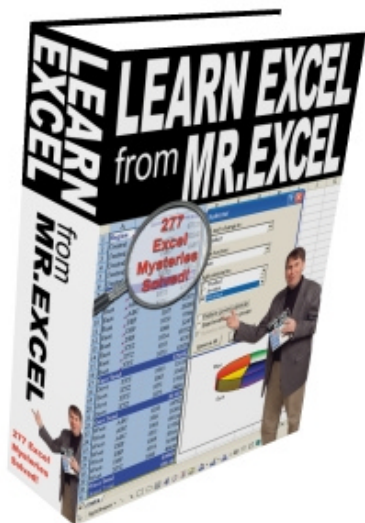




Free Preview – Week #26
Learn Excel from Mr Excel
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Five topics this week from the calculation section of the book. Learn about parentheses, & then four topics about formula precedents and tracing how a formula is actually calculated.

USE PARENTHESES TO CONTROL ORDER OF CALCULATIONS

.....

Problem: In what order does Excel perform calculations? Is $2+3*4$ equal to 20 or 14?

Strategy: Understand the default Excel order of calculations. If you do not use parentheses, the order is as follows:

1. Unary minus operation
2. Exponents
3. Multiply and divide left to right
4. Add and subtract left to right

Thus, if you had the formula $=5+4*-5T3/6$, Excel would do the following:

1. Figure unary minus on -5 .
2. Raise -5 to the third power ($-5*-5*-5 = -125$).
3. Do division and multiplication from left to right ($4*-125$ is -500 . Then $-500/6$ is -83.3).
4. Add 5 ($-83.3 + 5$ is -78.3).

The answer will be -78.3 .

You can control the order of operations by using parentheses. For example, the formula $=(5+4)*-(5T(1/2))$ will give an answer of -20.1246 , as shown in Fig. 471.

fx		$=(5+4)*-(5^{1/2})$	
C		D	
		-20.1246	

Fig. 471

Additional Details: In math class, you may have been taught that if you need to nest parentheses, start from the inside out using normal parenthesis, then square brackets, and then curly braces. In math class, you might have written:

$$\{(5+4)*[-5*(3/6)]\}+3$$

Forget all of that. In Excel, you use regular parentheses throughout.

$$((5+4)*(-5*(3/6)))+3$$

When I get the formula error message, as shown in Fig. 472, it is almost always because I've missed a closing parenthesis somewhere.

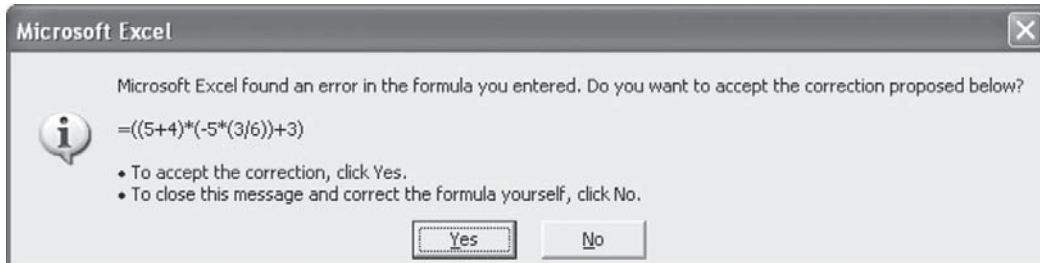


Fig. 472

In theory, as you enter or edit the formula, when you type a closing parenthesis, Excel bolds the corresponding opening parenthesis. However, this bolded condition lasts for only a moment and disappears before you can figure out what is going on. Fig. 473 was taken during the fleeting moment when the first and eighth parentheses were in bold.

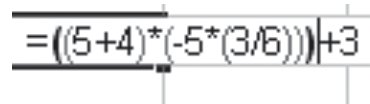


Fig. 473

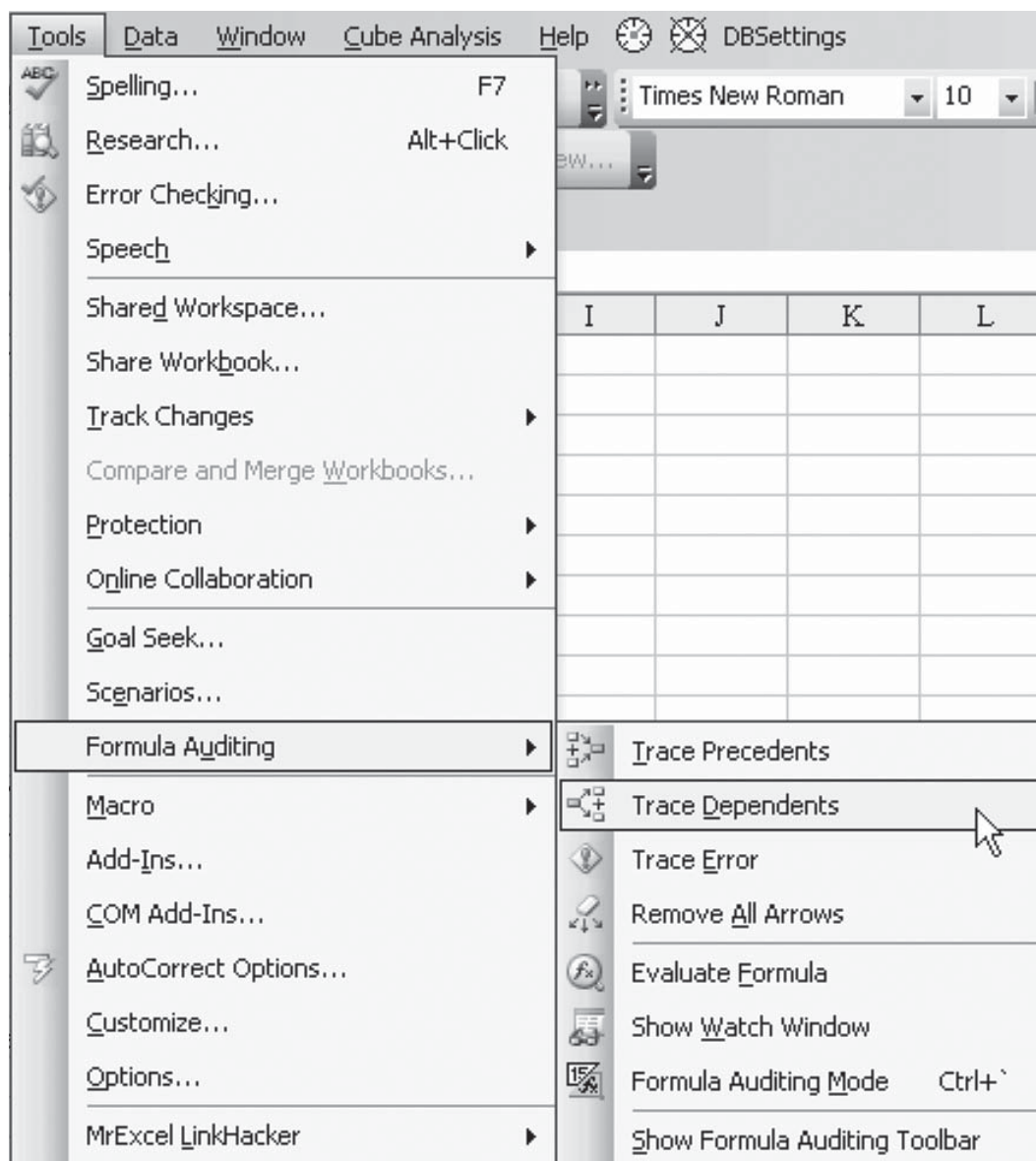
Alternate Strategy: For a very confusing formula with many sets of parentheses, use this technique. Highlight the formula in the formula bar. Use Ctrl+C to copy the formula. Paste it to a blank Notepad or Wordpad window and print. Use different colored highlighters to match up the various sets of parentheses until you find the extra parentheses.

Summary: Based on the default calculations Excel uses, placing parenthesis in a formula will produce the correct results.

BEFORE DELETING A CELL, FIND OUT IF OTHER CELLS RELY ON IT

Problem: You are about to delete a section of the worksheet that you believe is no longer being used. However, you know that if you delete the cell and some other far-off range relies on the cell, the far-off range will change to the dreaded #REF! error. How can you determine if any other range refers to this cell?

Strategy: Select the cell that you are considering for deletion. From the menu, select Tools – Formula Auditing – Trace Dependents as shown in Fig. 474. Dependents are other cells that rely on the current cell for calculation.



**Part
II**

Fig. 474

Blue arrows will draw from the active cell out to any dependents. In Fig. 475, cell D4 is used to calculate H4, and also a hidden cell in C26.

	A	B	D	E	F	G	H	
1	Section 1: Historical Trends (Per Month)							
2								
3		Store Type	Rent	Sales	Profit	Labor	Net	
4		Regular	2400	12456	6228	6480	-2652	
5		BigBox	5200	34500	17250	8640	3410	
6								
7	Section 2: Number of Stores							
8								
9		Regular						
10		BigBox						
11								
12	Section 3: Analysis of Profitability of Current Store Mix							
13			Net Profit NP%					
14		Total Chain	4951536	5.6%				
15		Regular	-2577744	-21.3%				
16		Big Box	7529280	9.9%				
17								
18	Section 4: Profit Projections with a New Mix of Stores							
19			Sales	Profit NP%				
20		Regular	0	0				
21		BigBox	99360000	9820800				
22		New Mix	99360000	9820800	10%			
23								
24	Cost of Closing Stores							
25		Labor						
26		Lost Rent						

Fig. 475

What if a dependent is on another worksheet? Excel will draw a black arrow to the “other worksheet” icon as shown in Fig. 476.

Type		Rent
ar		2400
x		5200

Fig. 476

Gotcha: Of course, it does not tell you *which* other worksheet has a dependent.

Additional Details: If you immediately invoke Tools – Formula Auditing – Trace Dependents, Excel will draw arrows from each of the dependent cells to their dependent cells. In Fig. 477, C4 is used to calculate H4. H4 is then used to calculate D15 and H20.

	A	B	D	E	F	G	H	I
1	Section 1: Historical Trends (Per Month)							
2								
3		Store Type	Rent	Sales	Profit	Labor	Net	
4		Regular	2400	12456	6228	6480	-2652	
5		BigBox	5200	34500	17250	8640	3410	
6								
7	Section 2: Number of Stores							
8								
9		Regular						
10		BigBox						
11								
12	Section 3: Analysis of Profitability of Current Store Mix							
13			Net Profit NP%					
14		Total Chain	4951536	5.6%				
15		Regular	-2577744	-21.3%				
16		Big Box	7529280	9.9%				
17								
18	Section 4: Profit Projections with a New Mix of Stores							
19			Sales	Profit NP%				
20		Regular	0	0				
21		BigBox	99360000	9820800				
22		New Mix	99360000	9820800	10%			
23								
24	Cost of Closing Stores							
25		Labor						
26		Lost Rent						
27				Year 1	Year 2	Year 3	Year 4	Yea
28	Increased Profit from New Stores			4869264	4869264	4869264	4869264	48692
29	Costs in year 1			1176120	0	0	0	

**Part
II**

Fig. 477

If you immediately ask to Trace Dependents several times in a row, you will see all of the formulas that would change to #REF! if you delete cell C4.

You also have a big mess on your spreadsheet! To get rid of all arrows, choose Tools – Formula Auditing – Remove All Arrows.

Additional Information: If you think that there are no cells that use the current cell and you are right, then Excel will give you the message shown in Fig. 478.

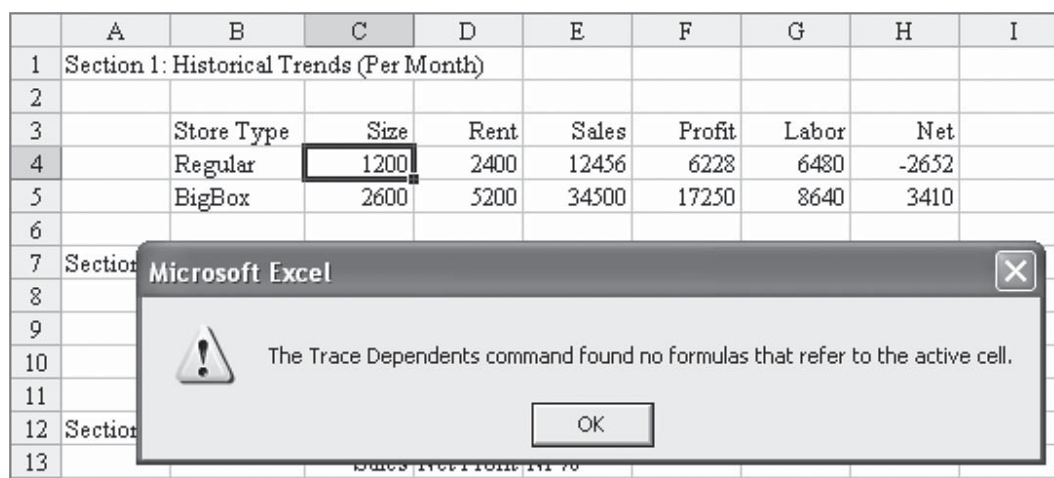


Fig. 478

Summary: To determine if a cell can be deleted without affecting any other formulas, select the cell, and then select Tools – Formula Auditing – Trace Dependents.

Commands Discussed: Tools – Formula Auditing – Trace Dependents

NAVIGATE TO EACH PRECEDENT

Problem: A tip of the hat to Howard Krams in New York for this tip. Howard uses huge massive spreadsheets with formulas that have a dozen precedents. He discovered an obscure way to navigate to each precedent on the current worksheet.

Strategy: The trick only works if you turn off the “in-cell editing” feature. As shown in Fig. 479, this is on Tools – Options – Edit, the top item on the left side.

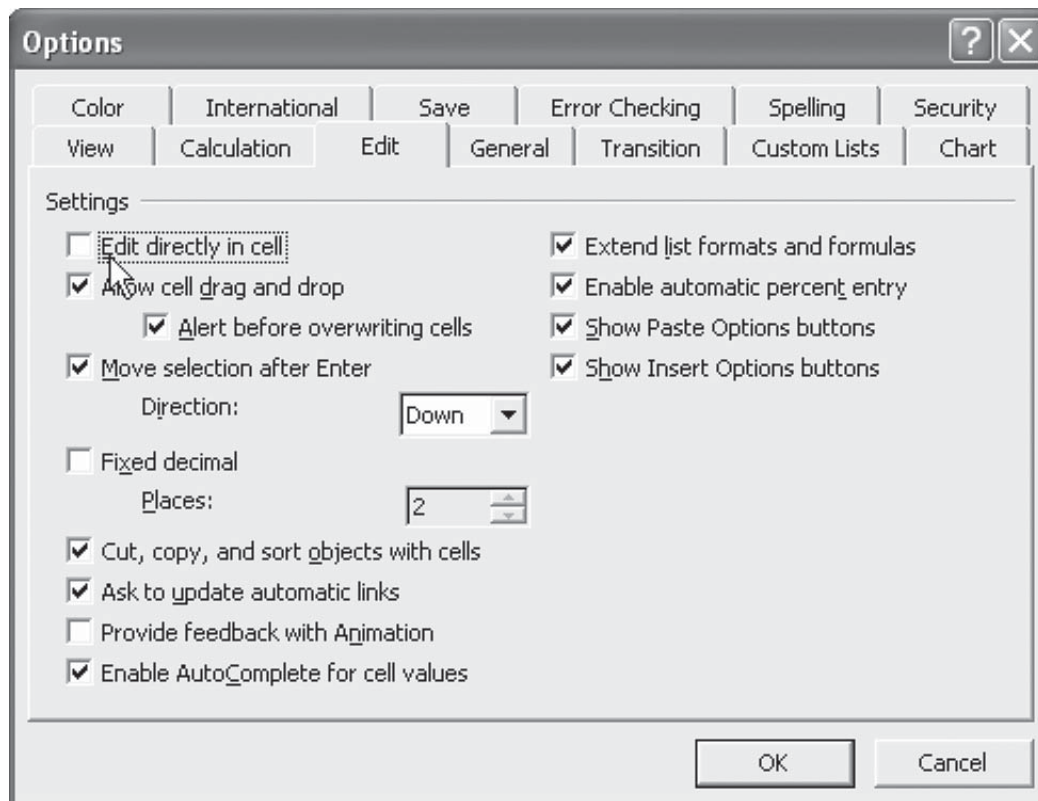


Fig. 479

- 1) Turn off the Edit Directly in Cell option. You can then go to any cell with a formula, as shown in Fig. 480.

▼	$f_x = (E30/C4)^{(D4/D5)} + D14 * E21 * E16$			
	C	D	E	F
			3693144	4869264
	Big Formula	3980883		

Fig. 480

- 2) Double-click the cell with the mouse. Excel moves to the first cell in the original formula. In this case, as shown in Fig. 481, that is cell E30, just a couple of rows up.

	A	B	C	D	E
30	Bottom Line				3693144
31					
32		Big Formula		3980883	
33					

Fig. 481

- 3) Hit the Enter key, and Excel will navigate to the next cell in the original formula. This will be cell C4, all the way at the top of the worksheet. Excel scrolls so that you can see cell C4. From this view, you can see that Excel has actually selected all of the precedent cells, as shown in Fig. 482.

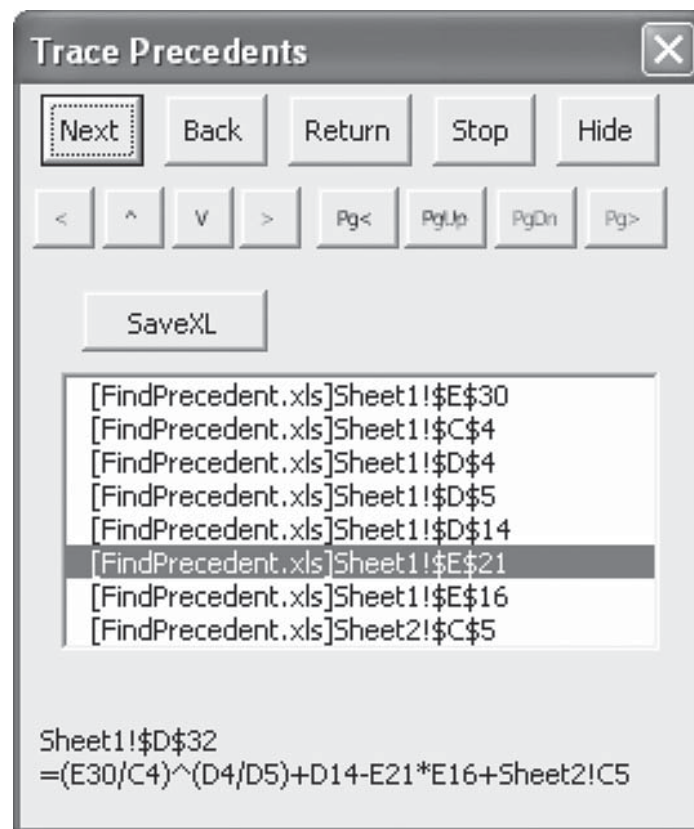
	A	B	C	D	E
4		Regular	1200	2400	12456
5		BigBox	2600	5200	34500
6					

Fig. 482

- 4) Continue hitting Enter to continue cycling through the precedents.

Gotcha: This feature was added to Excel back in Excel version 4. This was the last Excel version with only one worksheet in a workbook. They never dreamt of supporting precedents on other worksheets. So – this technique will not navigate to precedents on other sheets.

Shameless Commercial: When Howard pointed out this feature, he asked what it would take to actually make it work for any and all sheets. MrExcel Consulting wrote a utility for Howard that does a great job of tracing precedents, as shown in Fig. 483.



**Part
II**

Fig. 483

It lists all of the precedents, even precedents on other worksheets or in other open workbooks. You can use Next/Prev to move that particular precedent to the middle of the screen. If you are someone who needs to be able to track precedents, write to MrExcel Consulting to buy this utility.

Summary: There is an obscure feature in Excel that lets you navigate to all precedents of a formula. It works fairly well for precedents on the current worksheet.

Commands Discussed: Tools – Options – Edit – Edit In Cell

FORMULA AUDITING

Problem: You are trying to trace how a formula is calculating. If you have Excel 2002 or a later version, there is a cool new tool on the Formula Auditing menu.

Strategy: Select the cell with the formula. From the menu, select Tools – Formula Auditing – Evaluate Formula, as shown in Fig. 484.

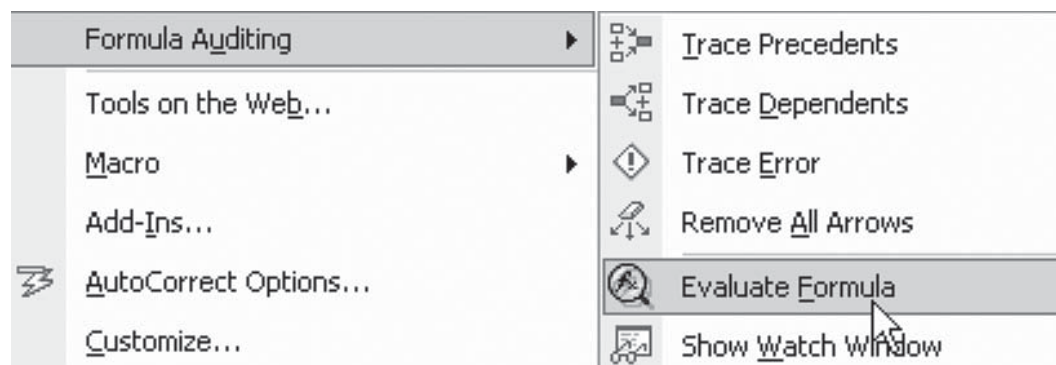


Fig. 484

The Evaluate Formula dialog shows the formula. The first item to be calculated is underlined, as shown in Fig. 485. Click Evaluate to calculate the underlined portion of the formula.

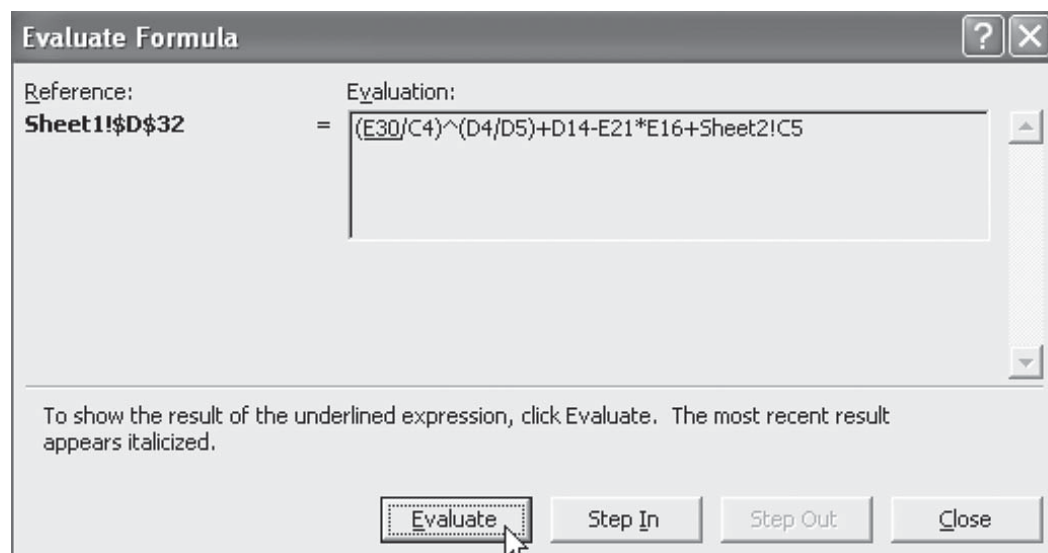
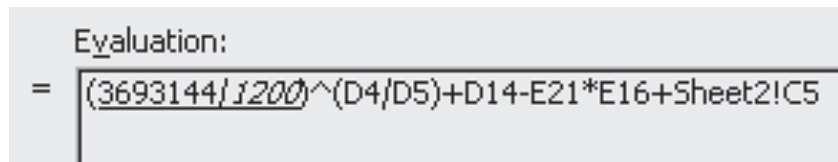
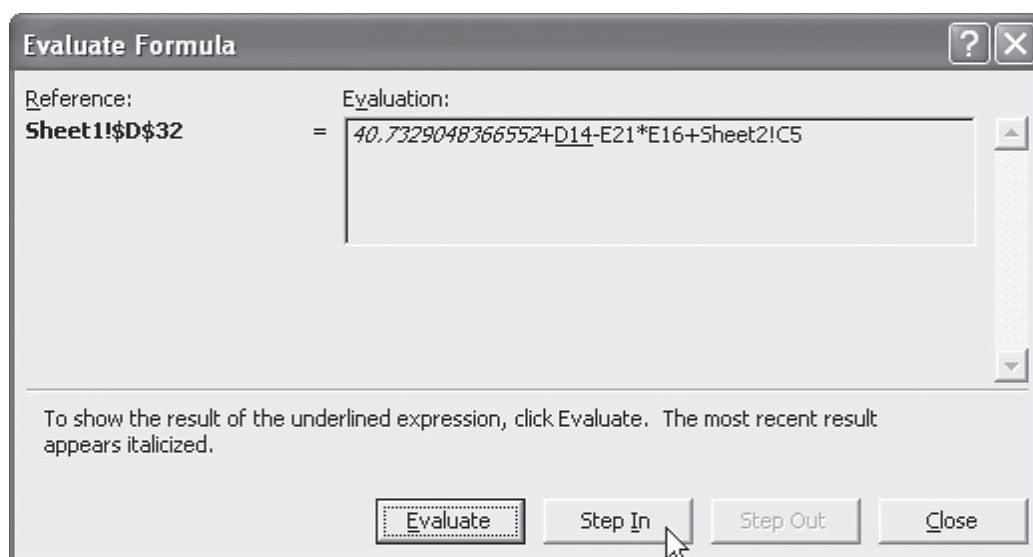


Fig. 485

With each click of Evaluate, Excel will calculate the underlined portion and show the results in italics. It will underline the next step in the calculation. Fig. 486 is after the second Evaluate. Excel just revealed that C4 is 1200 (in italics). It is about to calculate the first division in parentheses.

*Fig. 486*

Additional Information: Any time that the next term to be calculated is a cell reference, you can choose the Step In button to evaluate the formula in that cell. In Fig. 487, choosing Step In will evaluate D14.

**Part
II***Fig. 487*

As shown in Fig. 488, it is possible to Step In several levels. After seeing the formula for D14, you can choose to Step In to see the formula for D15.

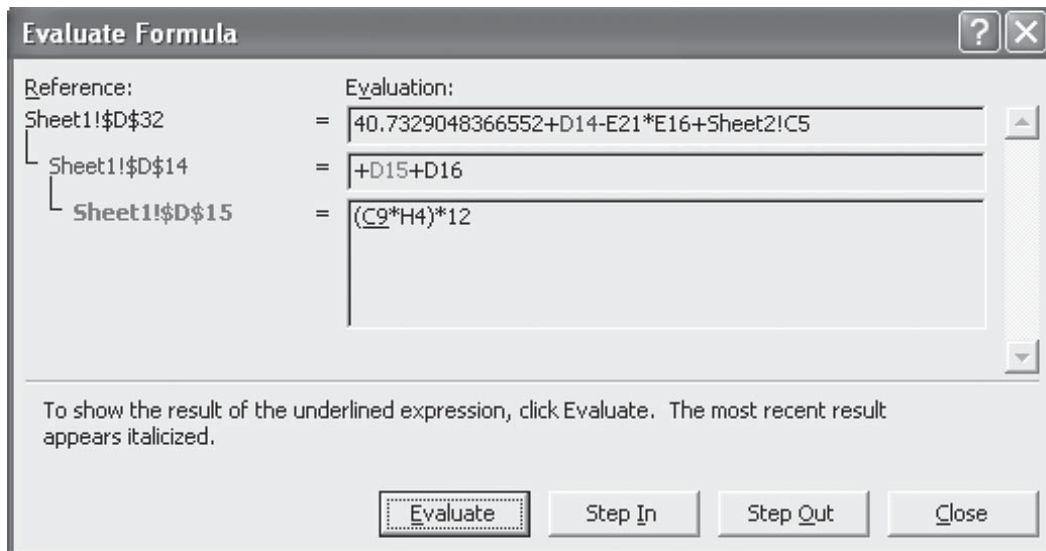


Fig. 488

Use Step Out to close the most recent detail level and go back one level, as shown in Fig. 489.

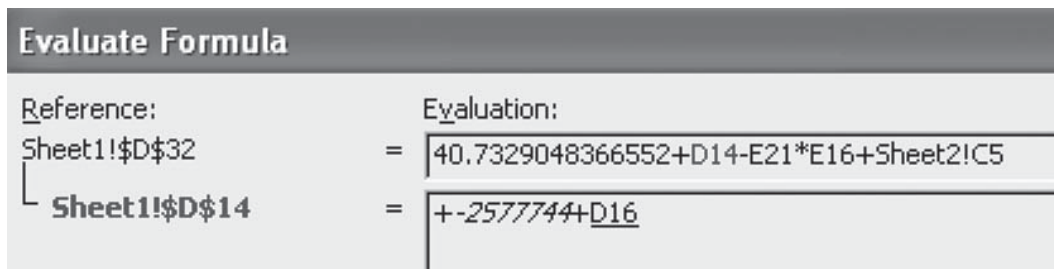


Fig. 489

Summary: This feature is a great tool. It basically gives you a great appreciation of just how much work Excel does every time you enter a formula, because it allows you to watch the calculation happen in slow motion.

Commands Discussed: Tools – Formula Auditing – Evaluate Formula

HOW IS THIS CELL CALCULATED?

Problem: You have a large formula. You would like to visually see how the cell is calculated.

Strategy: There are a few options.

Option 1: Select the cell. Hit F2 to edit the cell, as shown in Fig. 490.

COUNTA								X ✓ ✖		=(E30/C4)^(D4/D5)+D14-E21*E16+Sheet2!C5	
	A	B	C	D	E	F	G	H			
12	Section 3: Analysis of Profitability of Current Store Mix										
13			Sales	Net Profit	NP%						
14	Total Chain	88283232	4951536	5.6%							
15	Regular	12107232	-2577744	-21.3%							
16	Big Box	76176000	7529280	9.9%							
17											
18	Section 4: Profit Projections with a New Mix of Stores										
19			Sales	Profit	NP%						
20	Regular	0	0	0							
21	BigBox	240	99360000	9820800							
22	New Mix	240	99360000	9820800	10%						
23											
24	Cost of Closing Stores										
25	Labor	787320									
26	Lost Rent	388800									
27				Year 1	Year 2	Year 3	Year 4				
28	Increased Profit from New Stores			4869264	4869264	4869264	4869264				
29	Costs in year 1			1176120	0	0	0				
30	Bottom Line			3693144	4869264	4869264	4869264				
31											
32	Big Formula			Sheet2!C5							

**Part
II**

Fig. 490

As shown in Fig. 490, all of the references in the formula bar will light up with different colors. If the precedent cell is in the visible portion of the window, the cell will be surrounded by a box of the same color as the formula. You can't tell from this black and white book but, in the formula bar, cell E30 is a bright blue. The box around cell E30 is a matching blue. Cell C4 is a dark green. You cannot see C4 in the visible worksheet, so there is no matching dark green cell. Cell D14 is a light green in the formula bar. The box around D14 is a matching green. The final term of the formula points to an off-sheet reference. This term appears black in the formula bar.

Additional Information: If you need something more permanent than this, you can use Formula Auditing to draw the blue arrows to all of the precedent cells. Select cell D32. From the menu, choose Tools – Formula Auditing – Trace Precedents. Blue arrows draw to all the cells that are referenced in the D32 formula. As shown near the bottom left of Fig. 491, the arrow to the sheet icon indicates that at least one reference is on another worksheet.

3	C	D	E
Type	Size	Rent	Sales
ar	1200	2400	12456
ix	2600	5200	34500
2: Number of Stores			
ar	81		
ix	184		
3: Analysis of Profitability of Current St			
	Sales	Net Profit	NP%
Chain	88283232	4951536	5.6%
ar	12107232	-2577744	-21.3%
ox	76176000	7529280	9.9%
4: Profit Projections with a New Mix of S			
		Sales	Profit
ar	0	0	0
ix	240	99360000	9820800
Mix	240	99360000	9820800
Closing Stores			
	787320		
Rent	388800		
		Year 1	
ed Profit from New Stores		4869264	
t year 1		1176120	
Line		3693144	
Big Formula		3980883	

Fig. 491

If you immediately Trace Precedents enough times, Excel will trace the precedents of all the arrowed cells. After a few iterations of the command, you will see all of the cells that factor in to the calculation, as shown in Fig. 492.

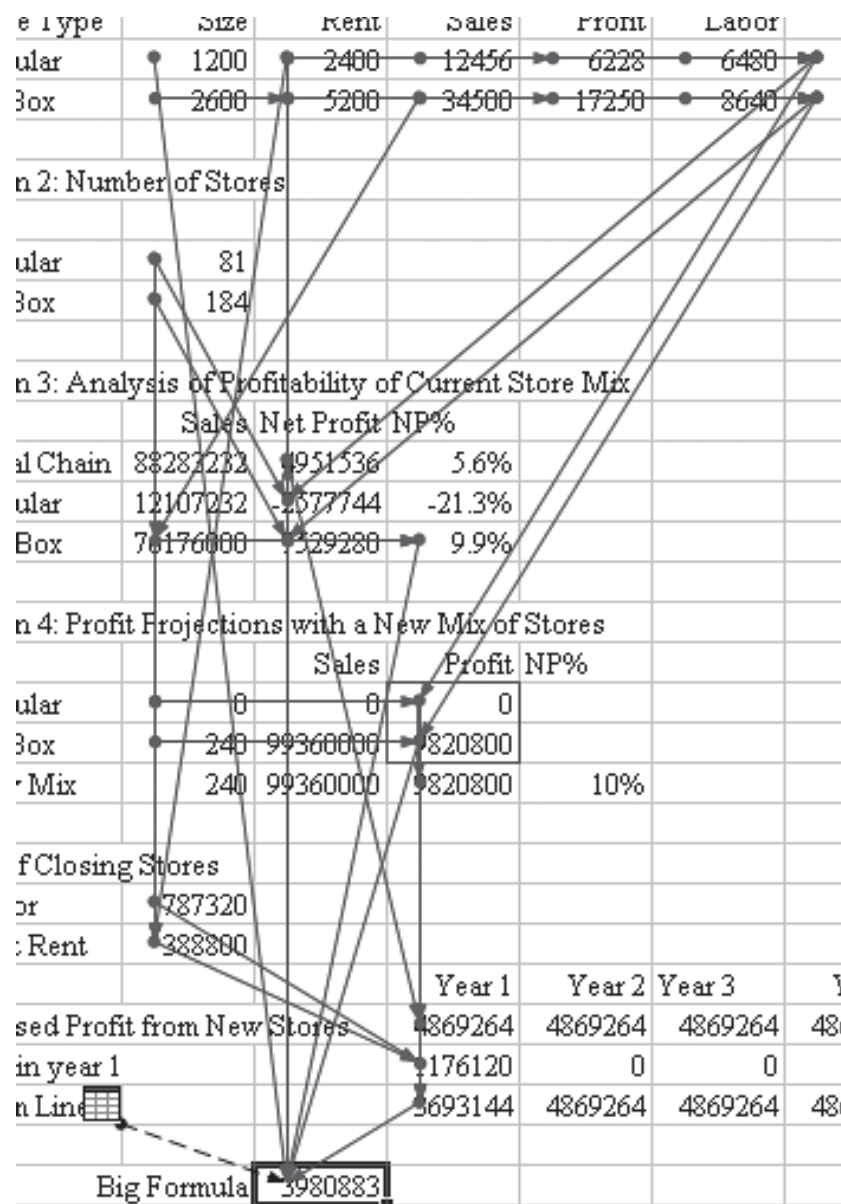


Fig. 492

To remove all of the arrows, choose Tools – Formula Auditing – Remove All Arrows.

Summary: Tracing Precedents gives you a quick visual view of all the cells that are used to calculate a formula.

Commands Discussed: Tools – Auditing – Trace Precedents;
Tools – Auditing – Remove All Arrows