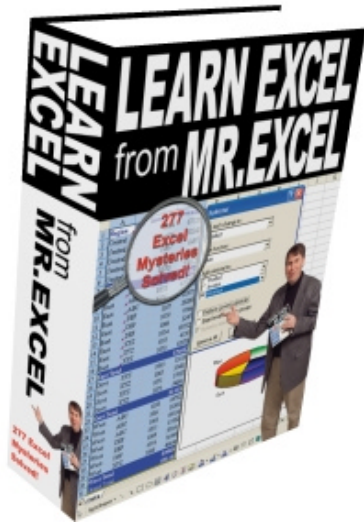




Free Preview – Week #29
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This week - five topics on using criteria
to sum or count records.

COUNT RECORDS THAT MATCH A CRITERIA

Problem: You have a large dataset, as shown in Fig. 562. You want to count the number of records that meet a certain criteria.

	A	B	C	D
1	Name	Gender	DOB	Age
2	Robert	M	5/27/1922	82
3	Xavier	M	12/19/1939	64
4	Paul	M	8/21/1940	64
5	Ophelia	F	9/7/1941	63
6	Allen	M	10/21/1941	63
7	Raul	m	5/18/1942	62
8	Marc	M	3/27/1943	61

Fig. 562

Strategy: Use the COUNTIF function. This function requires two arguments. The first is a range of cells that you want to test. The second is a test. To count the records where the gender is “M”, use =COUNTIF(B2:B57, “M”), as shown in Fig. 563.

G2		fx =COUNTIF(\$B\$2:\$B\$57,"M")					
	A	B	C	D	E	F	G
1	Name	Gender	DOB	Age			Count
2	Robert	M	5/27/1922	82		Male	28
3	Xavier	M	12/19/1939	64		Female	
4	Paul	M	8/21/1940	64			

Fig. 563

Note that the second argument of “M” indicates tells Excel to count records that are equal to M. Since this function is not case sensitive, the function will count cells with M or m.

**Part
II**

If you want to count the records where the age is a specific number, as shown in Fig. 564, then you can write the formula either with or without quotes around the number:

=COUNTIF(C2:C999,32)

=COUNTIF(C2:C999,“32”)

G5		fx =COUNTIF(\$D\$2:\$D\$57,"32")					
	A	B	C	D	E	F	G
1	Name	Gender	DOB	Age			Count
2	Zoe	F	3/2/1979	25		Male	28
3	Zeke	M	11/3/1949	55		Female	28
4	Zack	M	2/4/1944	60			
5	Xavier	M	12/19/1939	64		32	1
6	William	M	7/10/1951	53			
7	Wendy	F	10/15/1972	32			
8	Victor	M	10/25/1944	60			

Fig. 564

The criteria can look for items that are below or above a certain number:

=COUNTIF(C2:C999,“<40”)

=COUNTIF(C2:C999,“>21”)

Summary: To count how many cells contain certain criteria, use the COUNTIF function by entering the two criteria it needs, which cells to count, and what to count.

Functions Discussed: =COUNTIF()

BUILD A TABLE THAT WILL COUNT BY CRITERIA

Problem: You need to build a summary table using COUNTIF functions. How can you enter one formula that can be copied?

Strategy: It is possible to use a cell reference as the second argument in the COUNTIF function. Set up a table below your data. Place all of the possible values for a column, such as department, in column A, as shown in Fig. 565.

	A	B	C	D
1	Name	Gender	DOB	Age
53	William	M	7/10/1951	5
54	Xavier	M	12/19/1939	6
55	Zack	M	2/4/1944	6
56	Zeke	M	11/3/1949	5
57	Zoe	F	3/2/1979	2
58				
59	Employees by Department			
60				
61	Accounting			
62	Engineering			
63	Marketing			
64	Mfg			
65	Sales			

Fig. 565

- 1) In column B of the first row, enter =COUNTIF(\$B\$2=\$B\$56, A61), as shown in Fig. 566. Note that you should use the F4 key to make the B2:B56 range absolute. This will allow you to copy B61 to cells B62:B65.

	B61		fx =COUNTIF(\$E\$2:\$E\$57,A61)			
	A	B	C	D	E	F
1	Name	Gender	DOB	Age	Department	
57	Zoe	F	3/2/1979	25	Engineering	
58						
59	Employees by Department					
60						
61	Accounting	7				
62	Engineering					
63	Marketing					
64	Mfg					
65	Sales					

Fig. 566

- 2) Double-click the Fill handle to copy the formula down to B62:B65.

**Part
II**

Result: As shown in Fig. 567, the table shown below provides a summary of your dataset.

	B65		fx =COUNTIF(\$E\$2:\$E\$57,A65)			
	A	B	C	D	E	F
1	Name	Gender	DOB	Age	Department	
57	Zoe	F	3/2/1979	25	Engineering	
58						
59	Employees by Department					
60						
61	Accounting	7				
62	Engineering	11				
63	Marketing	9				
64	Mfg	22				
65	Sales	7				

Fig. 567

Summary: Using COUNTIF with a cell reference as the second argument allows you to set up various tables to summarize your data by department, gender, or any field.

Functions Discussed: =COUNTIF()

BUILD A SUMMARY TABLE TO PLACE EMPLOYEES IN AGE BANDS

Problem: How can you build a table that will group the employees in age ranges? The COUNTIF criteria cannot handle an argument that combines two conditions.

Strategy: This problem is more difficult.

- 1) In column A, enter a variety of age ranges, such as “>=75”, “>=65”, “>=55”, “>=45”, etc. In column B, enter a formula =COUNTIF(\$D\$2:\$D\$57,A61), as shown in Fig. 568.

	B61		fx =COUNTIF(\$D\$2:\$D\$57,A61)			
	A	B	C	D	E	F
1	Name	Gender	DOB	Age	Department	
57	Zoe	F	3/2/1979	25	Engineering	
58						
59	Employees by Age					
60						
61	>=65	1				
62	>=55	17				
63	>=45	31				
64	>=35	41				
65	>=21	56				

Fig. 568

However, the results of this formula are cumulative. The 17 employees in the over-55 category include the one employee in the over-65 category. The 41 employees in the over-35 category include all of the people in the over-45, -55, and -65 categories.

To get the real answer for any age band, you need to subtract all of the previous age bands. Look at this table:

Row 62: need to subtract row 61

Row 63: need to subtract rows 61 & 62

Row 64: need to subtract rows 61:63

Row 65: need to subtract rows 61:64

The rule, then, is that you need to subtract from row \$61 to the row above the current cell.

- 2) Edit the formula in row 62. As shown in Fig. 569, add `-SUM(B$61:B61)` to the formula. Adding this new part to the formula will subtract the sum of B\$61:B61. It is important that you have a dollar sign only before the first 61.

B62		fx =COUNTIF(\$D\$2:\$D\$57,A62)-SUM(B\$61:B61)						
	A	B	C	D	E	F	G	H
1	Name	Gender	DOB	Age	Department			
57	Zoe	F	3/2/1979	25	Engineering			
58								
59	Employees by Age							
60								
61	>=65	1						
62	>=55	16						

Fig. 569

- 3) Copy the formula down to the other rows.

The single dollar sign in just one portion of the reference allows the formula to be copied down. As you copy this formula down to the other rows, the portion subtracted will expand. As you look at Fig. 570, note that in row 65 the formula is subtracting Rows 61 through 64.

B65		fx =COUNTIF(\$D\$2:\$D\$57,A65)-SUM(B\$61:B64)						
	A	B	C	D	E	F	G	H
1	Name	Gender	DOB	Age	Department			
57	Zoe	F	3/2/1979	25	Engineering			
58								
59	Employees by Age							
60								
61	>=65	1						
62	>=55	16						
63	>=45	14						
64	>=35	10						
65	>=21	15						

Fig. 570

Additional Information: The solution above required two different formulas, one formula in 61 and a different formula in 62 through 65. Personally, I hate using two formulas. One workaround would have been to subtract from row 60:60. By having the anchor row be the row above the first row in the table, you could have used the same formula in all cells of the table.

Gotcha: At this point, the labels in column A are not technically correct. One solution would be to cut the formulas in column B and paste to column C, as shown in Fig. 571. It is important to use Cut and Paste instead of Copy and Paste so that the references keep pointing to column A. You can then type correct labels in column B and hide the information in column A by making the font white.

	A62		fx	'>=55
	A	B	C	D
1	Name	Gender	DOB	Age
57	Zoe	F	3/2/1979	25
58				
59		Employees by Age		
60				
61		Over 65	1	
62		55-64	16	
63		45-54	14	
64		35-44	10	
65		21-34	15	

Fig. 571

Summary: This particular use of COUNTIF is tricky. You almost need two conditions, which COUNTIF cannot handle. Luckily, the criteria were adjacent to each other, so you could subtract the results of the previous formulas to get the result for a particular age band.

Functions Discussed: =COUNTIF(); =SUM()

TOTAL REVENUE FROM ROWS THAT MATCH A CRITERION

Problem: Say that you want to total the sales made by Ben in the dataset shown in Fig. 572.

	A	B	C	D	E
1	Invoice	Rep	Customer	Product	Sales
2	1010	Deb	D6287	ABC	186
3	1011	Chaz	J4769	ABC	108
4	1012	Ben	O5956	ABC	157
5	1013	Amy	H1139	DEF	166
6	1014	Ben	W6177	XYZ	157

Fig. 572

Strategy: Excel offers the SUMIF function, which is somewhat similar to the COUNTIF function. To count records for Ben you would use: =COUNTIF(B2:B99,"Ben"), as shown in Fig. 573.

	A	B	C	D	E	F	G
1	Invoice	Rep	Customer	Product	Sales		
97	1105	Chaz	N8977	ABC	202		
98	1106	Ben	K5508	ABC	116		
99	1107	Ben	W9236	ABC	188		
100							
101			25				

Fig. 573

To use SUMIF, the first two arguments are the same. The final argument is the range to be summed. This must be the same shape as the first argument: =SUMIF(B2:B99,"Ben",E2:E99). Instead of including "Ben" as a constant in the formula, you could enter Ben in a nearby cell and refer to the cell instead. Fig. 574 shows a table of sales by rep. The formula in E101 is copied down to E102:E104.

	A	B	C	D	E	F	G	H
1	Invoice	Rep	Customer	Product	Sales			
97	1105	Chaz	N8977	ABC	202			
98	1106	Ben	K5508	ABC	116			
99	1107	Ben	W9236	ABC	188			
100								
101				Ben	5208			
102				Chaz	4684			
103				Amy	5408			
104				Deb	5157			
105								

Fig. 574

Additional Information: If for some reason the first and third arguments are the same range, you are allowed to drop the third argument. One example of this is if you need to sum all sales where sales are greater than 200, then you can use:

`=SUMIF(E2:E99,">200")`

Summary: Use SUMIF when you need to total certain rows from a dataset on the basis of one condition.

Functions Discussed: =SUMIF()

USE CONDITIONAL SUM WIZARD TO HELP WITH SUMIF

Problem: Conditional Formulas such as SUMIF and COUNTIF might be hard to figure out at first. CSE formulas needed to sum on the basis of two conditions are definitely hard to figure out. Is there an easier way?

Strategy: Excel offers a wizard that can walk you through building the formula. To install the wizard, Select Tools – Addins – Conditional Sum Wizard, as shown in Fig. 575.

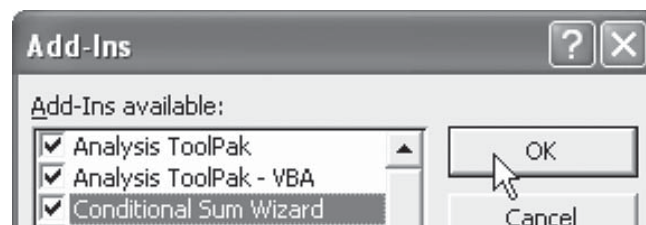


Fig. 575

Caution: *This is no longer in the default install. You may need your installation CDs.*

As shown in Fig. 576, the Add-In adds a new item to the bottom of the Tools menu called “Conditional Sum”.

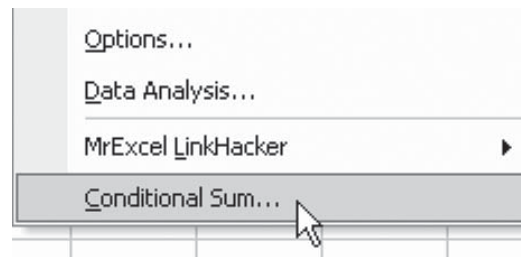
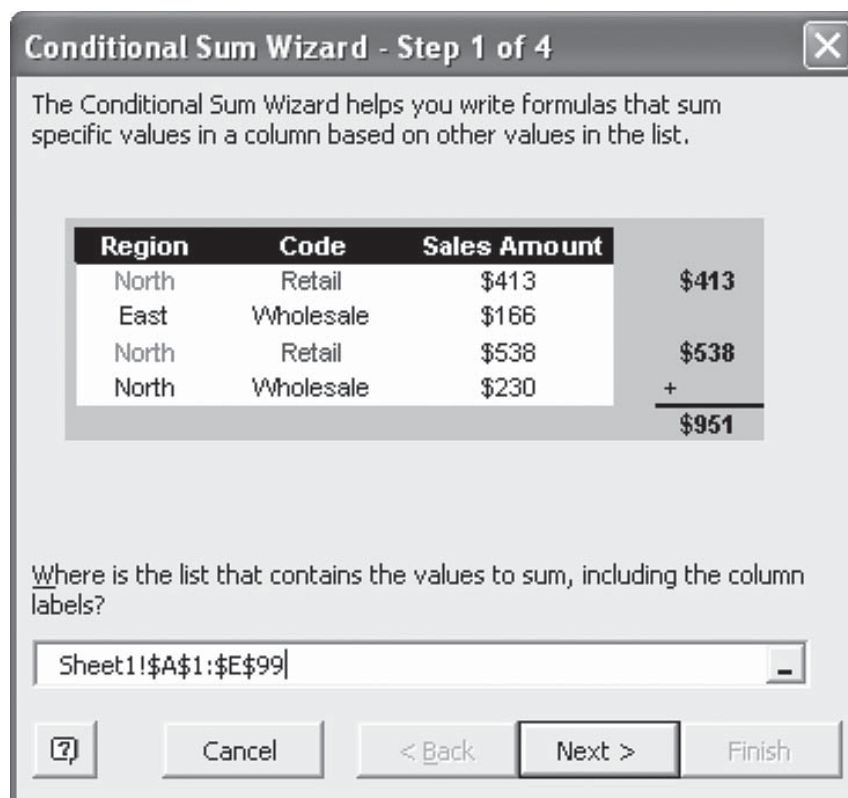


Fig. 576

- 1) Identify the range of your dataset in the Conditional Sum Wizard – Step 1 of 4, as shown in Fig. 577.



**Part
II**

Fig. 577

- 2) Select the column that you wish to Sum in Step 2, as shown in Fig. 578.

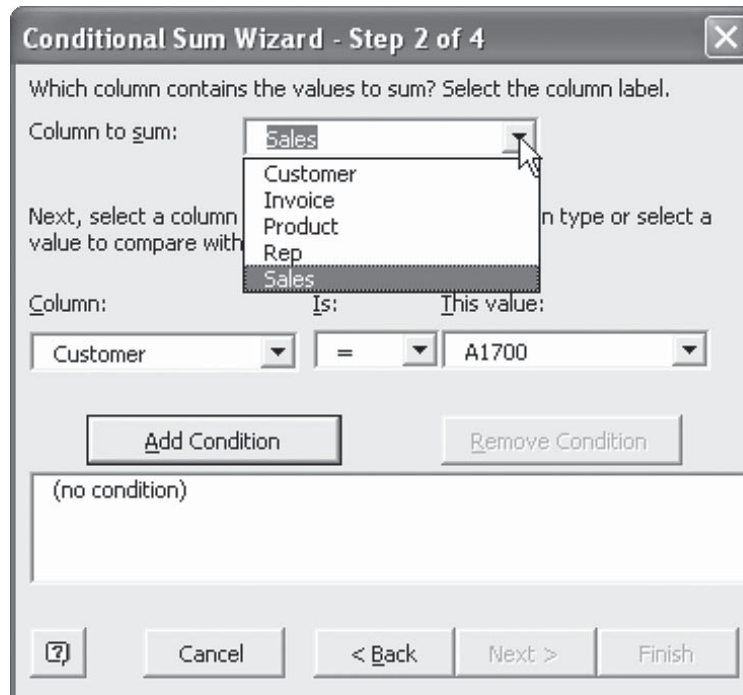


Fig. 578

- 3) Still in Step 2, build a condition using the dropdowns and choose Add Condition, as shown in Fig. 579.

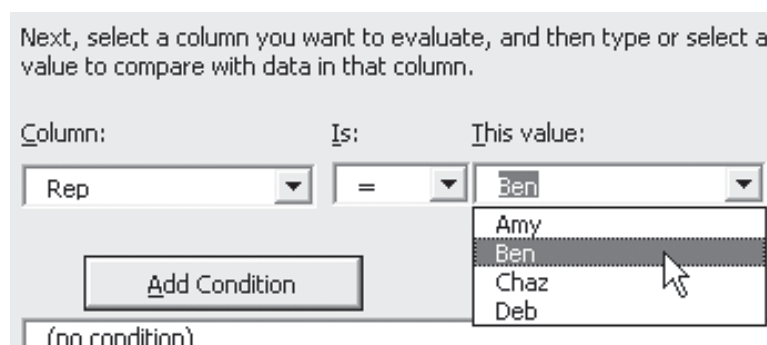


Fig. 579

You can even add multiple conditions, as shown in Fig. 580.

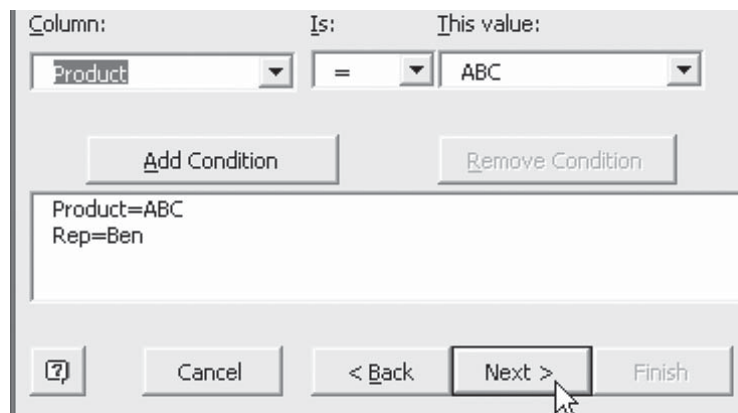


Fig. 580

- 4) As shown in Step 3 in Fig. 581, you can either create a single cell with the answer or you can set up a range of cells with rep name, product name, and the formula for the answer. Choose the second option. This will allow you to change Ben to Amy and have the formula update.

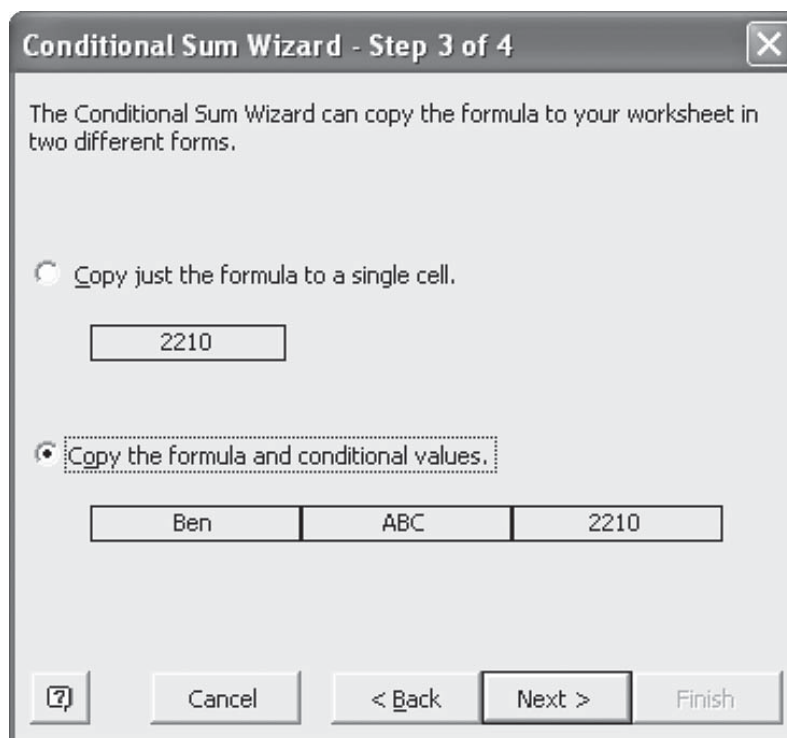
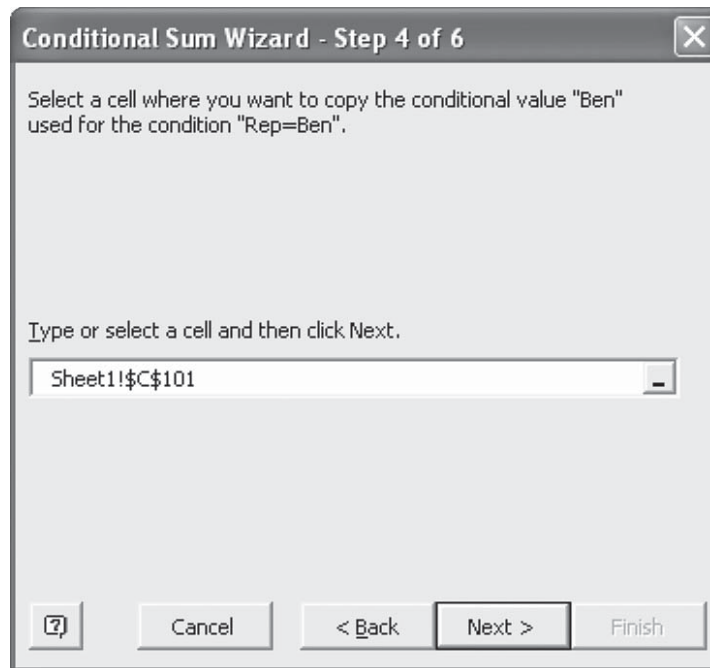
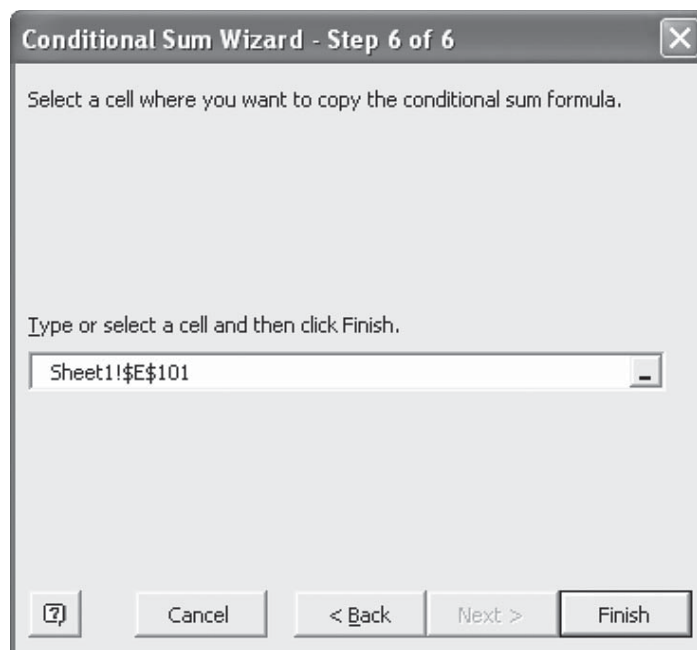
**Part
II**


Fig. 581

- 5) Note in Fig. 582 that you now have a six-step wizard instead of the four-step wizard you had in Fig. 581. This is due to the preceding answer, where you selected “Copy the formula and conditional values”. In Step 4 of 6, you choose where to put the first field.

*Fig. 582*

- 6) Step 5 asks where the product should go. Your answer should be Sheet1!\$D\$101.
- 7) Step 6 asks where the final formula should go, as shown in Fig. 583.

*Fig. 583*

Result: The wizard has allowed you to build an incredibly complex CSE formula, as shown in Fig. 584.

E101		=SUM(IF(\$B\$2:\$B\$99=C101,IF(\$D\$2:\$D\$99=D101,\$E\$2:\$E\$99,0),0))									
	A	B	C	D	E	F	G	H	I	J	K
1	Invoice	Rep	Customer	Product	Sales						
98	1106	Ben	K5508	ABC	116						
99	1107	Ben	W9236	ABC	188						
100											
101			Ben	ABC	2210						
102											

Fig. 584

After the wizard has built the first formula, you can enter a table of reps and products and copy the formula down to the other rows, as shown in Fig. 585.

**Part
II**

	A	B	C	D	E	F
1	Invoice	Rep	Customer	Product	Sales	
98	1106	Ben	K5508	ABC	116	
99	1107	Ben	W9236	ABC	188	
100						
101			Ben	ABC	2210	
102			Amy	ABC	998	
103			Chaz	ABC	2456	
104			Deb	ABC	1181	
105			Ben	DEF	1551	
106			Amy	DEF	2687	
107			Chaz	DEF	839	
108			Deb	DEF	1870	
109			Ben	XYZ	1447	
110			Amy	XYZ	1723	
111			Chaz	XYZ	1389	
112			Deb	XYZ	2106	

Fig. 585

Gotcha: When you copy cell E101, be sure that your paste range starts in E102. Normally, you could paste in E101:E112, but there is a limitation on CSE or Array formulas. If you attempt to paste E101 on top of itself, you will get the following error, as shown in Fig. 586: “You cannot change part of an array.”

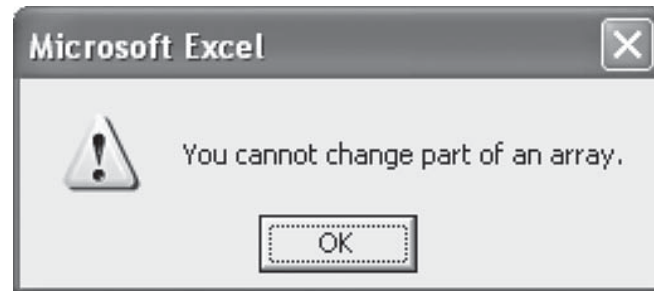


Fig. 586

To get around this, copy E101 and paste to E102:E112.

Additional Information: If you edit the result of the Conditional Sum Wizard, you cannot complete the edit by using Enter. You have to hold down Ctrl+Shift while hitting Enter.

Summary: The Conditional Sum Wizard is a fantastic tool for building complex formulas based on one or more conditions.

Commands Discussed: Tools – AddIns; Tools – Conditional Sum