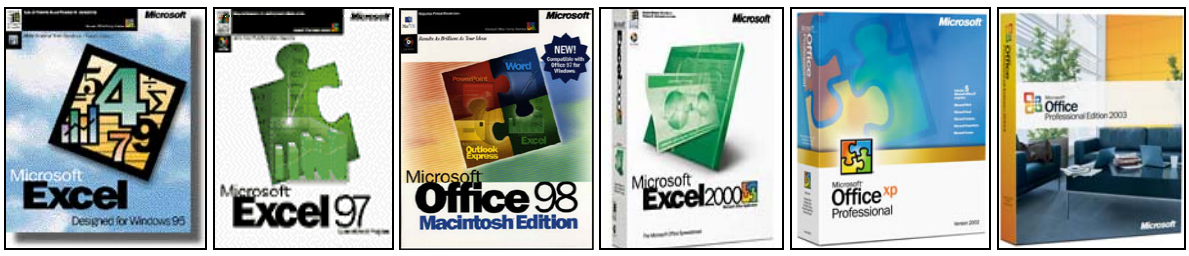
COMPLEX CALCULATIONS

CHAPTER 4



CHAPTER 4 SUMMARY

Using Arithmetic For Accruals And Deferrals

Adding Labels And Numbers

Parsing Data

=LEFT and =MID

SUMPRODUCT

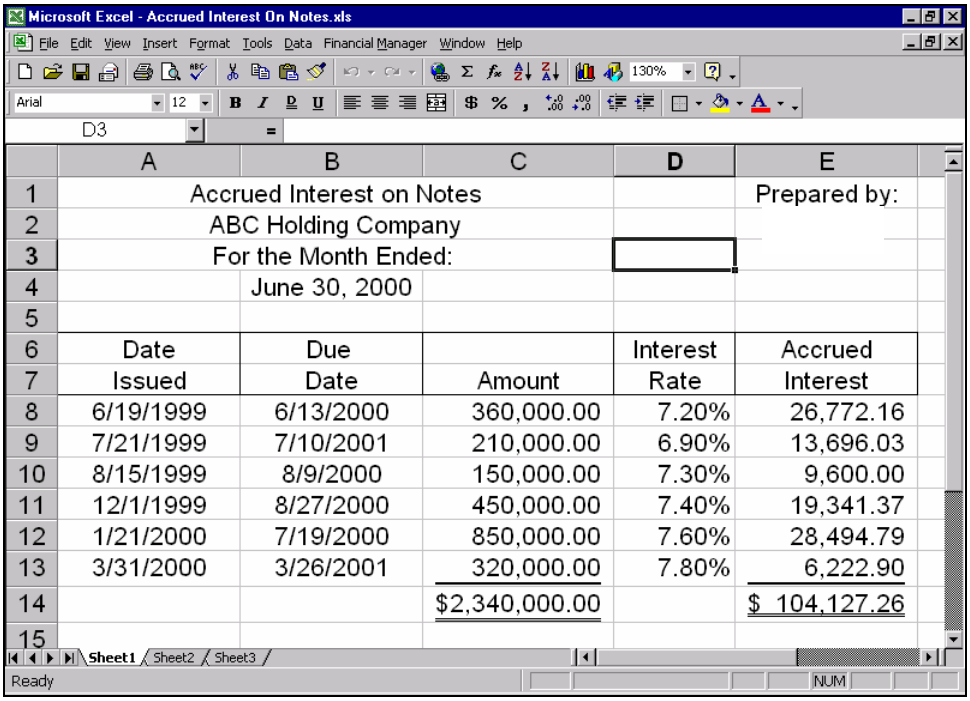
SUMIF() and COUNTIF()

Array Formulas

Boolean Operators and Error Trapping Functions

USING ARITHMETIC FOR ACCRUALS & DEFERRALS

Accountants and other financial professionals allocate numerous expenses and revenues based on the passage of time. Interest and insurance are two prime examples. Because spreadsheets treat dates and time as numbers, you can use spreadsheet math to calculate allocations based on the passage of time.



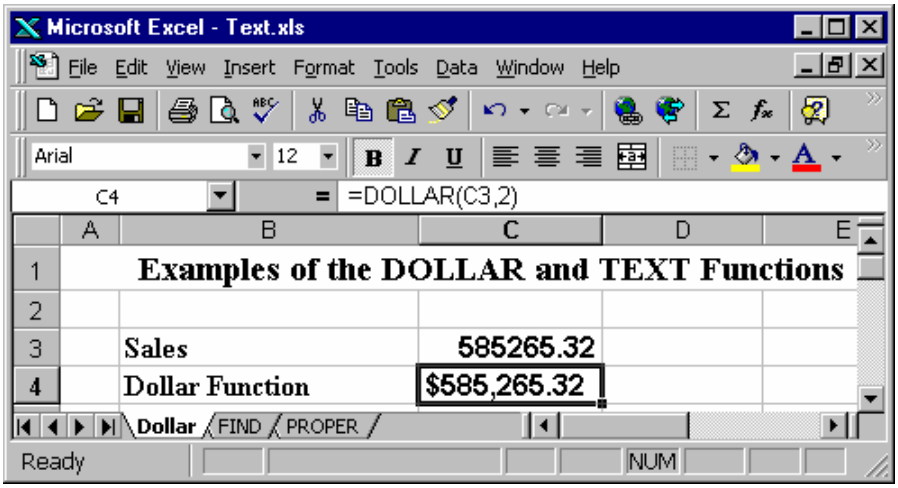
Calculating Accrued Interest on Notes Using Date Arithmetic

Since Excel also has =Month() and =Time() functions you can allocate expenses and revenues to the nearest month or, if you like, to the nearest second. Use a 4-digit year - When entering dates

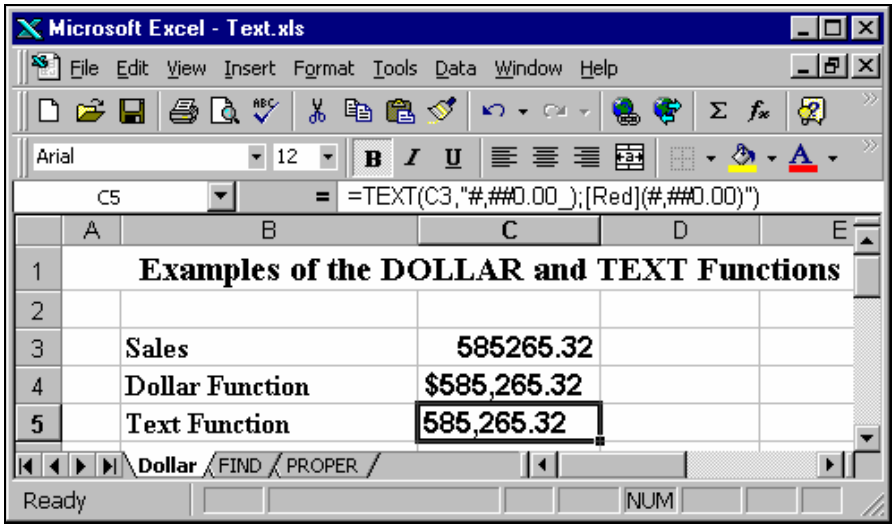
such as December 01, Excel matches the day first and then the year. For instance, December 01 is entered as December 1 of the present year, not as December of the year 2001.

ADDING LABELS & NUMBERS

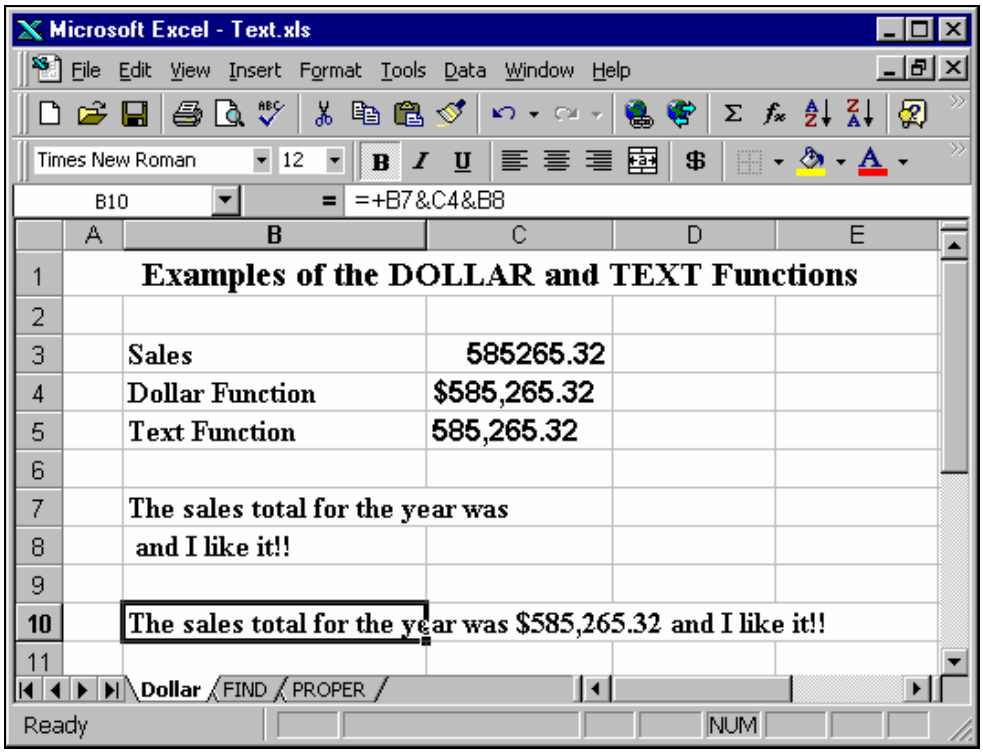
DOLLAR and TEXT Function - The DOLLAR function converts a value into a string, however, the cell formatting for the resulting string becomes the currency format with whatever number of decimal places you specify in the formula.



The TEXT function converts a value into a string, however, the cell formatting for the resulting string becomes whatever you specify in the function. You have complete control over the format and enter the format just as you would when constructing a custom format using the Format Cells command.



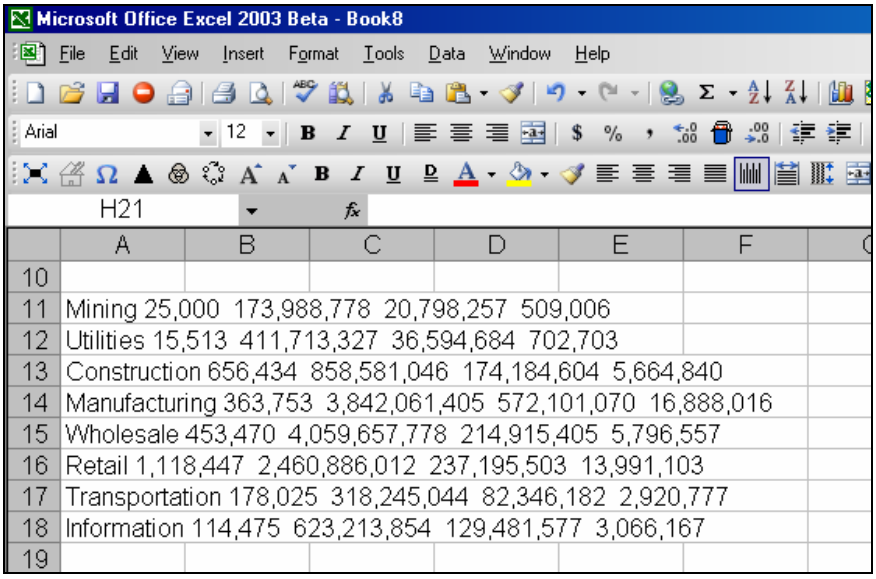
Both the DOLLAR and the TEXT functions allow you to add strings (i.e. labels) and values by converting values to strings.



Using the Dollar Function to Get Formatting When Adding Labels & Numbers

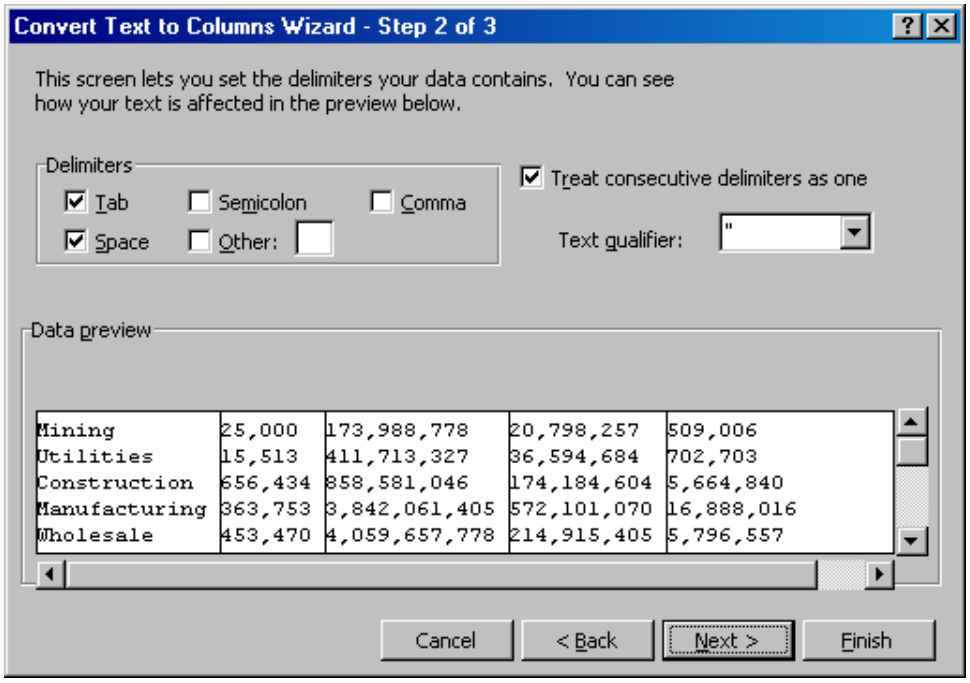
PARSING DATA

It is not uncommon to come across a database file where some of the information had been in columns in a manner that does not allow us to sort or manipulate the information as we need. For example, presented below is selected information from the US Census that needs to be parsed.

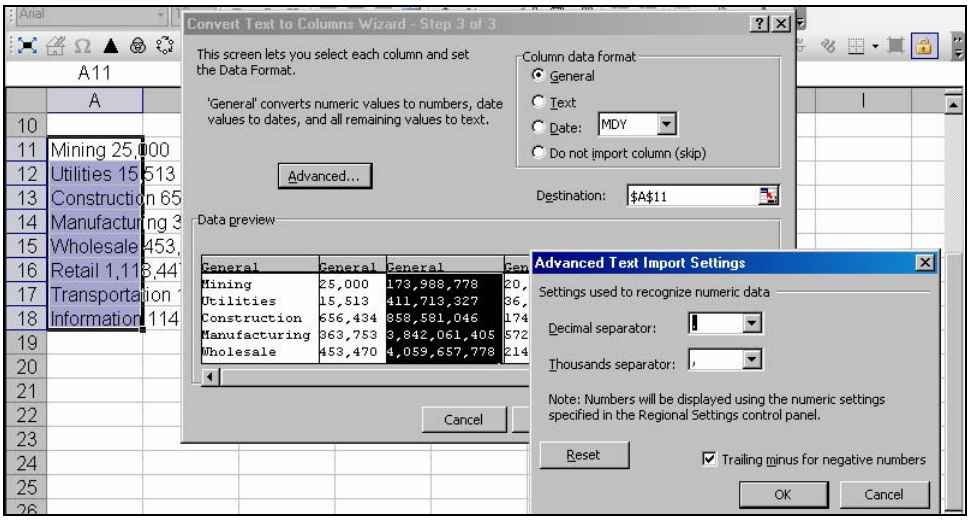


Data that Needs to Be Broken Into Columns

There are several options for converting this type of data to multiple columns. In the next section of this chapter we show how you can use text formulas to make the conversion. You can also use the Text to Columns command on the Data menu.



Going Through the Text to Columns Wizard the First Time

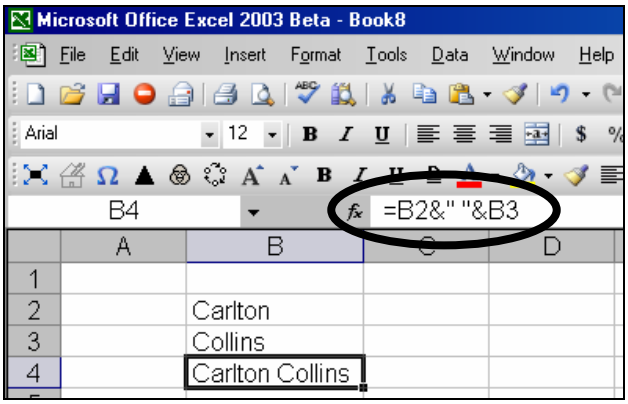


If desired, you can select a fixed width for one column only

The Wizard Lets You Specify Exact Field Width and Data Format.

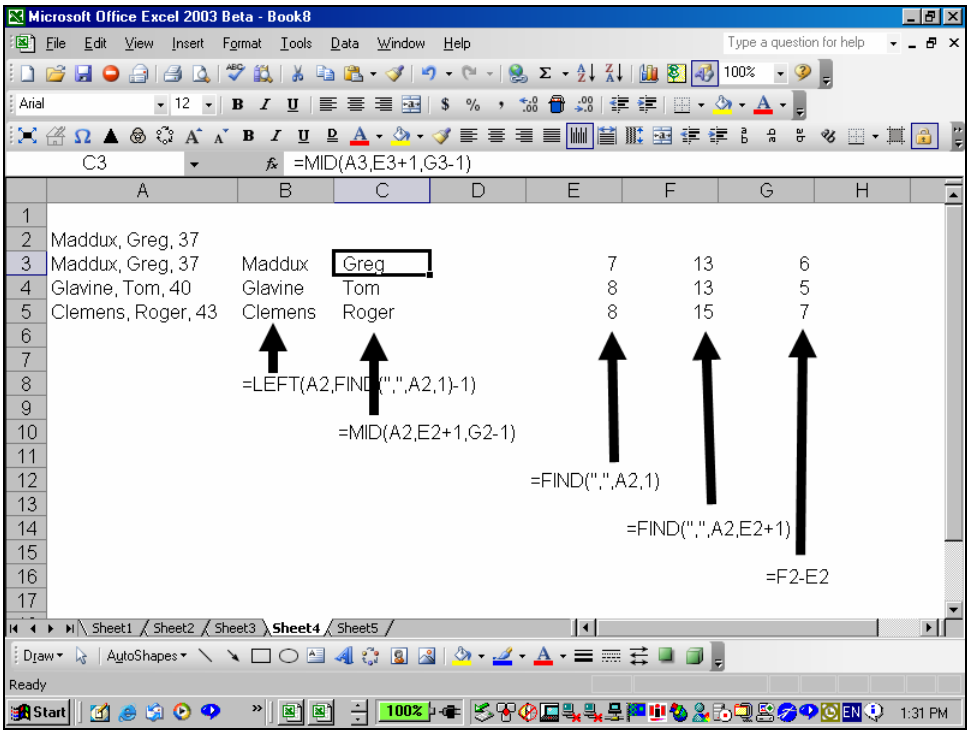
=LEFT & =MID

Text functions can be used to perform mathematical like functions with text, to combine text with numbers, and to parse text into separate cells. The following are examples of how some of the over 20 text functions can be used in financial spreadsheets.



Adding Labels with String Arithmetic

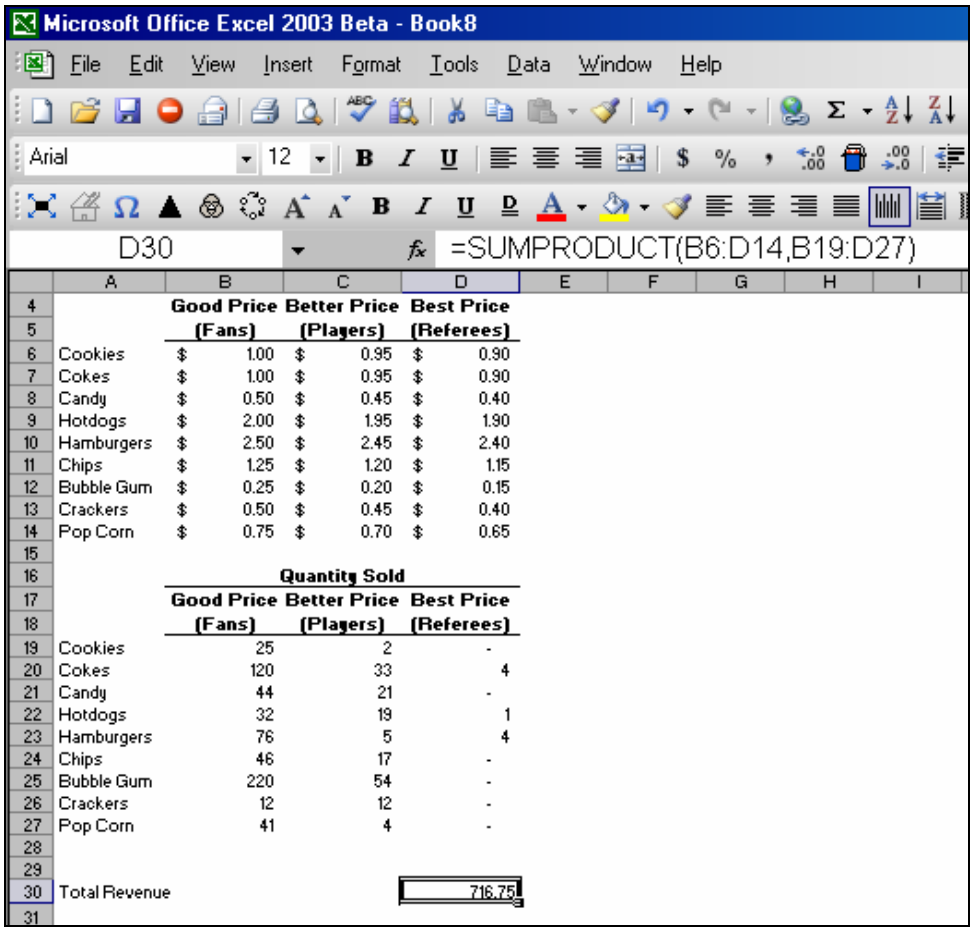
FIND, LEFT, RIGHT, LEN, SEARCH, and MID - These text functions are useful in building formulas that parse a label in one cell into multiple labels in multiple cells. For example, suppose you get a database where someone has entered both the last name and the first name in the same column (i.e. database field). You could use these text functions as follows to split the first and last name:



Using String Arithmetic to Parse Labels into Columns

SUMPRODUCT

If you ever needed to sum multiple ranges you may have gone to a lot more trouble than was necessary. For example, the screen below shows data for a ball park concession stand, and the total amount of revenue generated in one night:



		Good Price (Fans)	Better Price (Players)	Best Price (Referees)
Cookies	$	1.00	$ 0.95	$ 0.90
Cokes	$	1.00	$ 0.95	$ 0.90
Candy	$	0.50	$ 0.45	$ 0.40
Hotdogs	$	2.00	$ 1.95	$ 1.90
Hamburgers	$	2.50	$ 2.45	$ 2.40
Chips	$	1.25	$ 1.20	$ 1.15
Bubble Gum	$	0.25	$ 0.20	$ 0.15
Crackers	$	0.50	$ 0.45	$ 0.40
Pop Corn	$	0.75	$ 0.70	$ 0.65

Quantity Sold

	Good Price (Fans)	Better Price (Players)	Best Price (Referees)
Cookies	25	2	-
Cokes	120	33	4
Candy	44	21	-
Hotdogs	32	19	1
Hamburgers	76	5	4
Chips	46	17	-
Bubble Gum	220	54	-
Crackers	12	12	-
Pop Corn	41	4	-

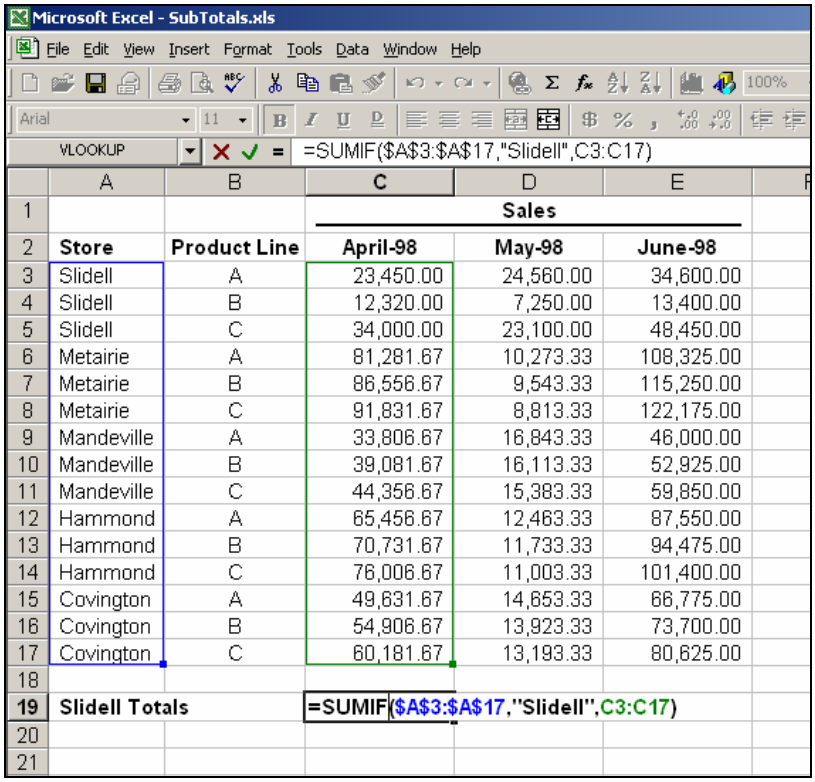
Total Revenue 716.75

Using SUMPRODUCT to Sum Multiple Ranges

There are several ways you can arrive at the answer. The most time consuming would be to multiply each of the matching pairs of cells and all the totals. A much easier way would be to use Excel's SUMPRODUCT function. This function multiplies the corresponding values from multiple arrays, and then sums the products.

SUMIF() AND COUNTIF()

As an alternative to using Data Subtotals, you can use the SUMIF() and COUNTIF() functions to sum or count data based on an identified criterion. For example, if you wanted to sum the sales generated by the Slidell store, you could use a simple formula to accomplish the task. The function requires you to specify an evaluation range, an evaluation criterion, and a range of values to sum if the criterion is true. The following screen contains an example using the SUMIF() function.



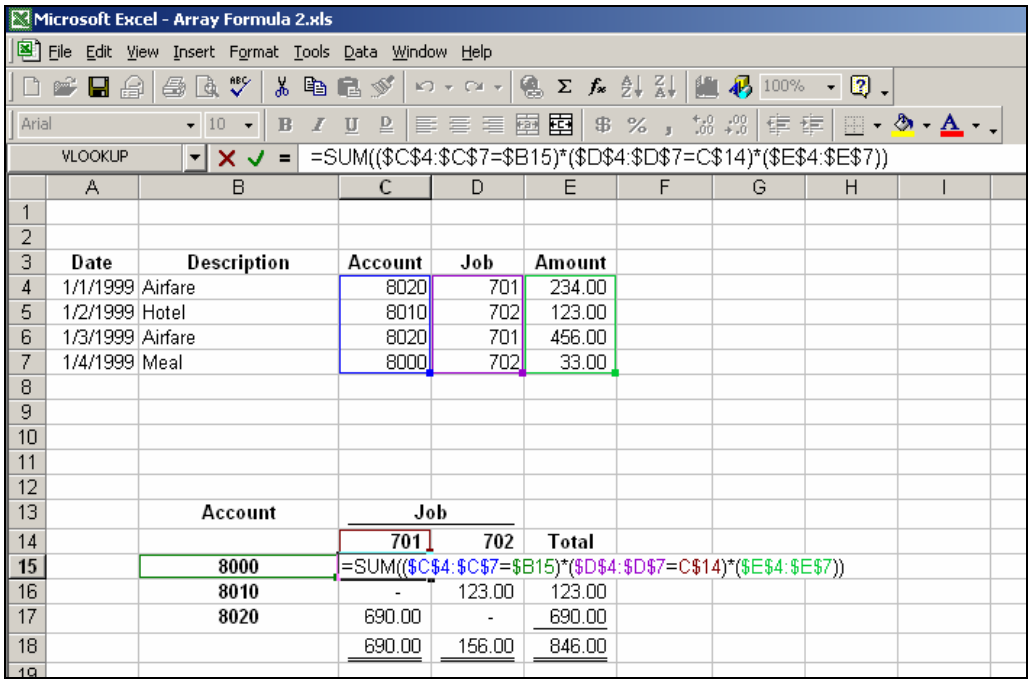
	A	B	C	D	E
1			Sales		
2	Store	Product Line	April-98	May-98	June-98
3	Slidell	A	23,450.00	24,560.00	34,600.00
4	Slidell	B	12,320.00	7,250.00	13,400.00
5	Slidell	C	34,000.00	23,100.00	48,450.00
6	Metairie	A	81,281.67	10,273.33	108,325.00
7	Metairie	B	86,556.67	9,543.33	115,250.00
8	Metairie	C	91,831.67	8,813.33	122,175.00
9	Mandeville	A	33,806.67	16,843.33	46,000.00
10	Mandeville	B	39,081.67	16,113.33	52,925.00
11	Mandeville	C	44,356.67	15,383.33	59,850.00
12	Hammond	A	65,456.67	12,463.33	87,550.00
13	Hammond	B	70,731.67	11,733.33	94,475.00
14	Hammond	C	76,006.67	11,003.33	101,400.00
15	Covington	A	49,631.67	14,653.33	66,775.00
16	Covington	B	54,906.67	13,923.33	73,700.00
17	Covington	C	60,181.67	13,193.33	80,625.00
18					
19	Slidell Totals		=SUMIF($A$3:$A$17,"Slidell",C3:C17)		
20					
21					

An Example of Using the SUMIF Function

ARRAY FORMULAS

The SUMIF() and COUNTIF() functions can only evaluate a single criterion. Sometimes, however, we may want to sum a range of values that meet multiple criteria, which is a good use of array formulas. For example, in the following spreadsheet, we want to sum the amount of each Account // Job combination, but the SUMIF() function only accepts one argument. Note that braces surround an array formula.

The braces cannot be typed in but are entered automatically by Excel when you enter the formula by pressing CTRL-SHIFT-ENTER. An array formula can do multiple calculations in a single cell or render multi-cell results from a single calculation. In this case, the array formula performs multiple calculations per cell.



Array Formula Example

Let's examine the formula, which has the absolute/relative reference dollar signs removed for clarity:

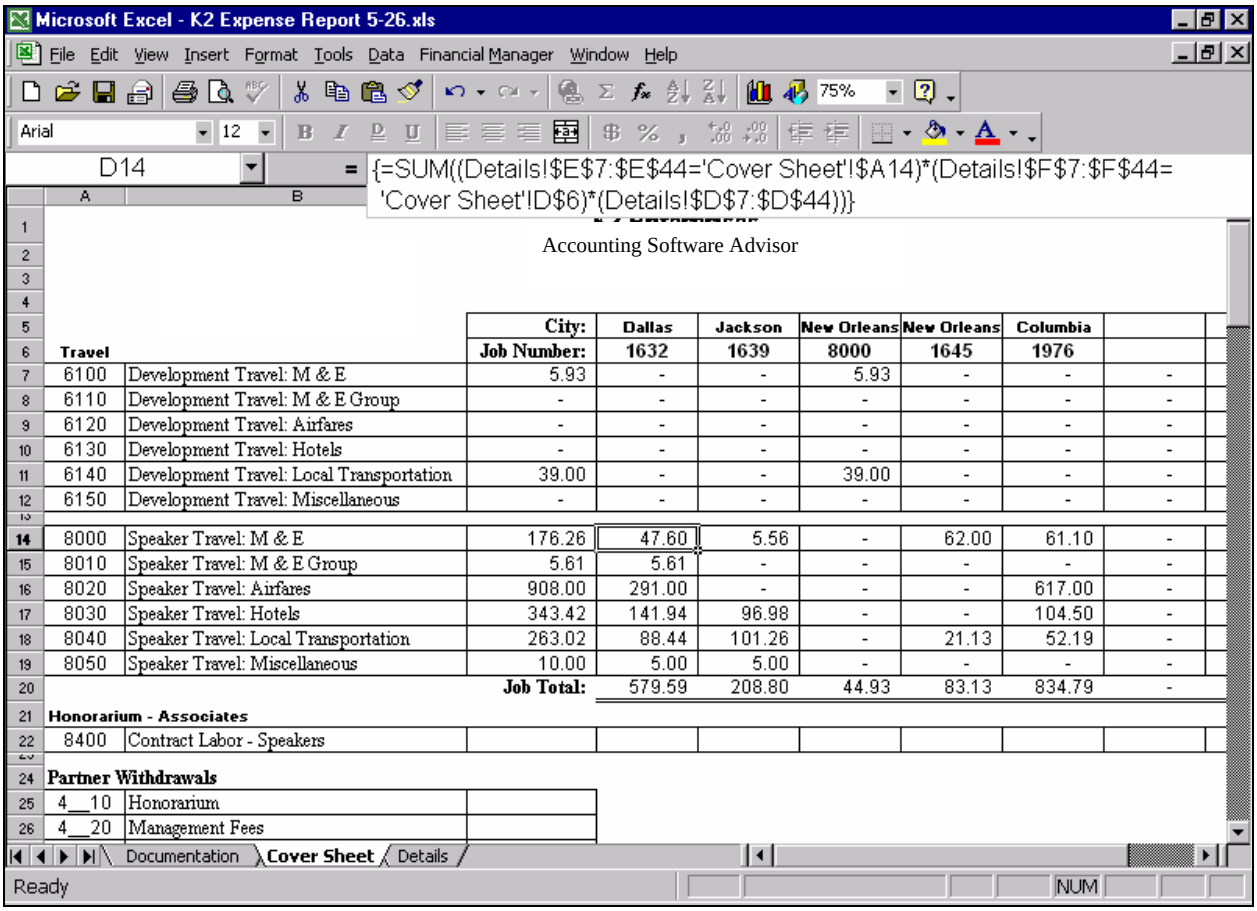
{=SUM((C4:C7=B15)*(D4:D7=C14)*(E4:E7))}

The formula in cell C15 first tests to see if each Account in the range C4:C7 is equal to 8000, and then tests if each Job in the range D4:D7 is equal to 701. If the result of a test is "False", the formula returns 0. If the result is "True", the formula returns 1. The results of each test are multiplied together and then multiplied by the requisite amount from the range E4:E7, before being summed by the formula. Here is a results table for each of the four cells in the evaluation matrix for cell C15.

Test 1 C4:C7=B15 8000		**Test 2 D4:D7=C14 701**		**Sum Values E4:E7 234, 123, 456, 33**		**Result**
0	*	1	*	234	=	0
0	*	0	*	123	=	0
0	*	1	*	456	=	0
1	*	0	*	33	=	0
				Total	=	**0**

There are no expense entries that are recorded for Account 8000 *and* Job 701. Consequently, the formula in cell C15 should evaluate to zero, which is the result evidenced by the evaluation matrix above. When testing multiple criteria, an AND condition is stated using the multiplication operator (*), and an OR condition is stated using the addition operator (+).

Similar results can be obtained for simple AND sums by using the Conditional Sum Wizard. Choose Tools, Wizard, Conditional Sum from the menu.



			City:	Dallas	Jackson	New Orleans	New Orleans	Columbia	
	Travel		Job Number:	1632	1639	8000	1645	1976	
7	6100	Development Travel: M & E	5.93	-	-	5.93	-	-	-
8	6110	Development Travel: M & E Group	-	-	-	-	-	-	-
9	6120	Development Travel: Airfares	-	-	-	-	-	-	-
10	6130	Development Travel: Hotels	-	-	-	-	-	-	-
11	6140	Development Travel: Local Transportation	39.00	-	-	39.00	-	-	-
12	6150	Development Travel: Miscellaneous	-	-	-	-	-	-	-
14	8000	Speaker Travel: M & E	176.26	47.60	5.56	-	62.00	61.10	-
15	8010	Speaker Travel: M & E Group	5.61	5.61	-	-	-	-	-
16	8020	Speaker Travel: Airfares	908.00	291.00	-	-	-	617.00	-
17	8030	Speaker Travel: Hotels	343.42	141.94	96.98	-	-	104.50	-
18	8040	Speaker Travel: Local Transportation	263.02	88.44	101.26	-	21.13	52.19	-
19	8050	Speaker Travel: Miscellaneous	10.00	5.00	5.00	-	-	-	-
20			Job Total:	579.59	208.80	44.93	83.13	834.79	-
21	Honorarium - Associates								
22	8400	Contract Labor - Speakers							
24	Partner Withdrawals								
25	4__10	Honorarium							
26	4__20	Management Fees							

An Example of Using An Array Formula to Sum by Job and by Account Code

In the above example expenses are entered on a separate sheet (i.e. the details sheet). The array formula sums up the expenses and allocates them to the correct account code and job number. This allows the person who is doing the posting to post by job number. The person preparing the expense report does not have to do any totaling as it is all done automatically.

BOOLEAN OPERATORS & ERROR TRAPPING FUNCTIONS

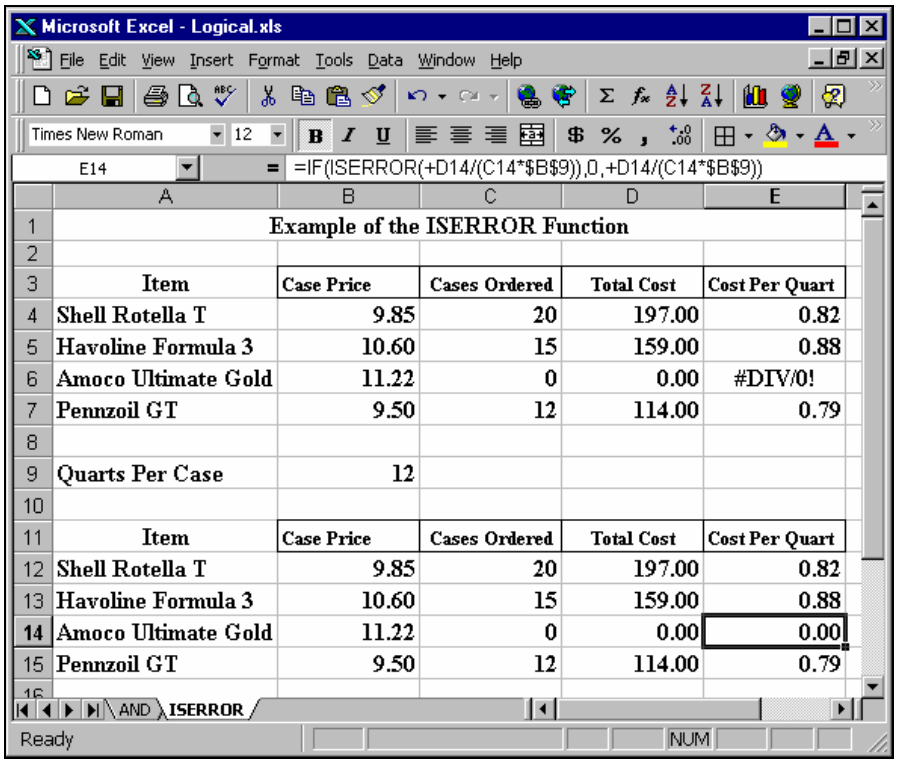
AND, OR, NOT - These functions can be used to help you develop compound conditional tests in IF functions and other places where conditional tests are used. For example, if your conditional test to evaluate is true if the number in cell C3 is both less than 50 and greater than 20 you would write the IF function this way:

```
=IF(AND(C3>20,C3<50),"Yes", "No")
```

If the number in cell C3 is greater than 20, and at the same time less than 50, the IF function would put the word Yes in the cell. Otherwise, it would put the word No in the cell.

ISERR, ISERROR, and ISNA - If you have a formula in your worksheet that refers to a cell that returns an error, that formula also returns an error. These functions can be used to test for error messages and along with the IF function (and others) can be used to branch to a different result if there is an error.

For example, if you have a calculation that divides one cell by another and the denominator cell is blank, the division by zero error message will occur. The ISERROR along with the IF function can be used to eliminate the error message.



Error Trapping with the ISERROR Function

NOTES