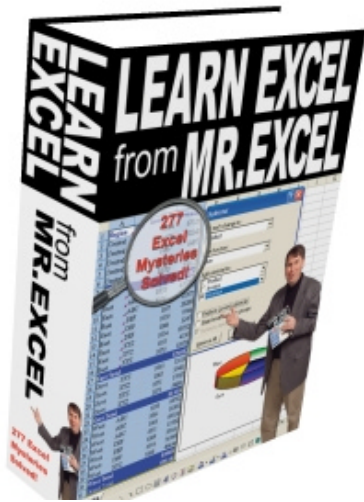




Free Preview – Week #12

Learn Excel from Mr Excel

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This Week: 5 Tips for interesting formulas.

ADD COMMENTS TO A FORMULA

Problem: You spent a great deal of time perfecting a formula, as shown in Fig. 386. You would like to leave yourself notes about it.

C4		fx =RANK(B4,\$B\$4:\$B\$13)+COUNTIF(B\$3:B3,B4)							
	A	B	C	D	E	F	G	H	I
1	Widget Production				Widget Production				
2									
3	Name	Total	Rank		Rank	Name	Total		
4	Ashley	80	6		1	Carl	92		
5	Bill	80	7		2	Dora	90		

Fig. 386

Strategy: There is an old Lotus 1-2-3 function that is still in Excel. This function is the N function. It turns out that N of a number is the number and N of any text is zero. Thus, you can add several N functions to a formula without changing the result, provided that they contain text.

Thus, if you have figured out some obscure formula, you can leave yourself notes about the formula, as shown in Fig. 387.

C4		fx =RANK(B4,\$B\$4:\$B\$13)+N("The first part of the formula returns a rank, but ties are given the same value")+COUNTIF(B\$3:B3, B4)+N("The CountIf finds any cells in the rows above this row that match this row. For each row that matches, 1 is added to the rank. This ensures that the second occurrence of a tie is given a one-higher ranking.")+N("For more details, see page 232 of the MrExcel book")							
	A	B	C	D					
1	Widget Production								
2									
3	Name	Total	Rank						
4	Ashley	80	6						
5	Bill	80	7						
6	Carl	92	1						
7	Dora	90	2						
8	Ed	79	8						
9	Frank	79	9						

Fig. 387

Summary: For particularly complicated formulas, leave yourself detailed comments right in the formula.

Functions Discussed: =N()

CALCULATE A PERCENTAGE OF TOTAL

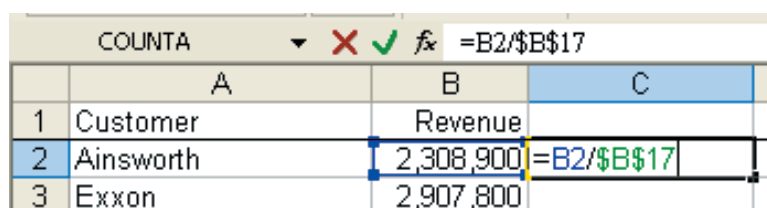
Problem: Your spreadsheet lists a number of customers with revenue, as shown in Fig. 423. There is a total at the bottom. You want to express each customer as a percentage of the total.

	A	B
1	Customer	Revenue
2	Ainsworth	2,308,900
3	Exxon	2,907,800
4	Ford	2,522,600
5	General Motors	3,145,200
6	IBM	1,693,000
7	Lucent	265,100
8	Molson, Inc	2,519,100
9	Nortel Networks	1,564,200
10	P&G	245,100
11	SBC Communications	290,100
12	Sears Canada	240,500
13	Shell Canada	292,500
14	Sun Life Financial	1,994,200
15	Verizon	1,636,700
16	Wal-Mart	3,490,000
17	Total	25,115,000

Fig. 423

Strategy: Follow these steps:

- 1) Select a cell next to the first revenue cell.
- 2) Type an Equal sign. Hit the Left Arrow.
- 3) Type the Forward Slash (/) sign. Hit the Left Arrow. Type the End key. Hit the Down Arrow. Your cell pointer should now be on the total cell. Type the F4 key. The formula bar should now show B2/\$B\$17, as shown in Fig. 424.



	A	B	C
1	Customer	Revenue	
2	Ainsworth	2,308,900	=B2/\$B\$17
3	Exxon	2,907,800	

Fig. 424

- 4) Hit Ctrl+Enter to enter the formula and stay in the current cell. Format the calculation as a percentage using the % icon, as shown in Fig. 425.

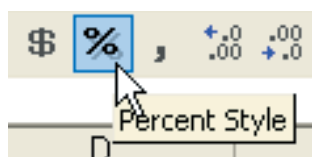


Fig. 425

- 5) If you wish to use a format of 9.2 percent instead of 9 percent, then choose the Increase Decimal button, as shown in Fig. 426.

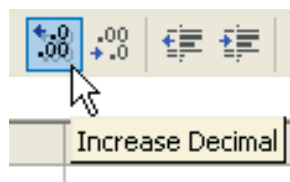


Fig. 426

- 6) In cell C2, double-click the Fill handle to copy the formula down to the other rows.
- 7) Add a heading for “% of Total”.

Additional Details: The key element of this procedure is hitting the F4 key to add dollar signs to the reference for the total row. As you copy the formula from C2 to C16, the formula is always going to compare the revenue in the current row to the total revenue in row 17, as shown in Fig. 427.

C16		fx =B16/\$B\$17	
	A	B	C
1	Customer	Revenue	% of Total
2	Ainsworth	2,308,900	9.2%
3	Exxon	2,907,800	11.6%
4	Ford	2,522,600	10.0%
5	General Motors	3,145,200	12.5%
6	IBM	1,693,000	6.7%
7	Lucent	265,100	1.1%
8	Molson, Inc	2,519,100	10.0%
9	Nortel Networks	1,564,200	6.2%
10	P&G	245,100	1.0%
11	SBC Communications	290,100	1.2%
12	Sears Canada	240,500	1.0%
13	Shell Canada	292,500	1.2%
14	Sun Life Financial	1,994,200	7.9%
15	Verizon	1,636,700	6.5%
16	Wal-Mart	3,490,000	13.9%
17	Total	25,115,000	100.0%

Fig. 427

Summary: Creating a Percentage of Total is a common task in Excel. Being able to quickly enter an initial formula that can be copied to all cells is a good technique to have in your skill set.

CALCULATE A RUNNING PERCENTAGE OF TOTAL

Problem: You have a report of revenue by customer, sorted in descending order, as shown in Fig. 428. Management consultants will often argue that you should concentrate your best team on the 20 percent of the customers who provide 80 percent of your revenue. How can you calculate a cumulative running percentage of the total?

	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	
3	General Motors	3,145,200	
4	Exxon	2,907,800	
5	Ford	2,522,600	
6	Molson, Inc	2,519,100	
7	Ainsworth	2,308,900	
8	Sun Life Financial	1,994,200	
9	IBM	1,693,000	
10	Verizon	1,636,700	
11	Nortel Networks	1,564,200	
12	Shell Canada	292,500	
13	SBC Communications	290,100	
14	Lucent	265,100	
15	P&G	245,100	
16	Sears Canada	240,500	
17			
18	Total	25,115,000	

Fig. 428

Strategy: I hate solutions that require two different formulas, but this is one of them. You will need one formula for cell C2 and a different formula for cells C3 and below.

- 1) In cell C2, enter a formula of `=B2/$B$18`. Format the result as a percentage with one decimal place, as shown in Fig. 429.

C2		fx =B2/\$B\$18	
	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	13.9%
3	General Motors	3,145,200	

Fig. 429

- 2) Copy C2 to just the next cell, as shown in Fig. 430. If you want, you can drag the Fill handle down one cell to copy the formula. Or, use Ctrl+C and then Ctrl+V.

	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	13.9%
3	General Motors	3,145,200	12.5%

Fig. 430

- 3) Hit F2 to edit the cell, as shown in Fig. 431.

	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	13.9%
3	General Motors	3,145,200	=B3/\$B\$18

Fig. 431

- 4) As shown in Fig. 432, type a Plus sign and touch cell C2. Hit Enter.

C3		fx =B3/\$B\$18+C2	
	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	13.9%
3	General Motors	3,145,200	26.4%

Fig. 432

- 5) Double-click the Fill handle in C3 to copy this formula down to all of the other cells.

Note that you do not want this formula to be added to your total row. As shown in Fig. 433, the dataset was purposely set up with the total row and the data separated by a blank row in order to prevent this formula from copying to the total row.

	A	B	C
1	Customer	Revenue	Running % Tot
2	Wal-Mart	3,490,000	13.9%
3	General Motors	3,145,200	26.4%
4	Exxon	2,907,800	38.0%
5	Ford	2,522,600	48.0%
6	Molson, Inc	2,519,100	58.1%
7	Ainsworth	2,308,900	67.3%
8	Sun Life Financial	1,994,200	75.2%
9	IBM	1,693,000	81.9%
10	Verizon	1,636,700	88.5%
11	Nortel Networks	1,564,200	94.7%
12	Shell Canada	292,500	95.9%
13	SBC Communications	290,100	97.0%
14	Lucent	265,100	98.1%
15	P&G	245,100	99.0%
16	Sears Canada	240,500	100.0%
17			
18	Total	25,115,000	
19			

Fig. 433

Additional Information: If you absolutely want to produce this total with a single formula, you could use this formula in C2 and copy it down, as shown in Fig. 434: =SUM(B2:B\$2)/B\$18. This works because the range B2:B\$2 is an interesting reference. It says to add up everything from the current row to the top row. This formula seems a bit less intuitive, so you might prefer the method shown earlier.

fx =SUM(B2:B\$2)/B\$18		
B	C	
Revenue	Running % Tot	
3,490,000	13.9%	
3,145,200	26.4%	

Fig. 434

Summary: The formula for a running percentage of the total is another common analysis tool. This technique offers two different options for calculating the formula.

FIGURE OUT LOTTERY PROBABILITY

Problem: The Super Lotto jackpot is \$8 million this week. Should you play?

Strategy: It depends on how many numbers are in the game. You need to figure out the number of possible combinations there are in the game.

You can use the COMBIN function to figure out the number of combinations by selecting six numbers out of a group of 40.

- 1) Set up a spreadsheet with the number of balls in your lotto game in cell C2.
- 2) Identify how many numbers you need to select correctly in cell D2.
- 3) Enter the formula =COMBIN(C2,D2) in cell E2, as shown in Fig. 451.

		fx	=COMBIN(C2,D2)
C	D	E	
Range 1 to	# to Win	Combinations	
40	6	3,838,380	
44	6	7,059,052	
48	6	12,271,512	
54	6	25,827,165	

Fig. 451

If your state lottery game requires you to select six numbers out of 40, then the odds against you winning are 3.83 million to one. For a \$1 bet and an \$8 million payout, the odds are in your favor.

For a game with 44 numbers, the odds are 7 million to one. This payoff is only slightly in your favor.

For games with 48 or 54 numbers, the payout is not worth the long odds of the game.

Additional Information: COMBIN figures combinations. Here, the sequence in which the balls are drawn in is not relevant. If you had a game where you had to match both the numbers and the order in which they were drawn, then you would want to use the PERMUT function to find the number of permutations of drawing six numbers in sequence out of 40.

Summary: Use the COMBIN or PERMUT functions for figuring the number of combinations or permutations.

Functions Discussed: =COMBIN(); =PERMUT()

HELP YOUR KIDS WITH THEIR MATH

Problem: Your kids have math homework. You want to check their answers. They are doing least common multiples, greatest common denominators, roman numerals, and factorials.

Caution: These functions require the Analysis Toolpack to be installed. From the menu, select Tools – Add-Ins, and select the Analysis Toolpack.

Strategy: All of these problems are now solvable with Excel.

Least Common Multiples: When you have to add fractions with different denominators, one of the first steps is to find the least common multiple of the two denominators. The math homework asks them to add $\frac{3}{4} + \frac{3}{26}$. You want to figure out the least common multiple of 4 and 26. Enter 4 in one cell and 26 in another cell. The formula to find LCM is =LCM(C2:D2), as shown in Fig. 452.

fx =LCM(C2:D2)		
C	D	E
First	Second	LCM
26	4	52

Fig. 452

You can now have your kids change $3/4$ to $39/52$ and $3/26$ to $6/52$. Expressing the problem as $39/52 + 6/52$ makes it easy to see that the answer is $45/52$.

Note: The LCM function can accept up to 29 numbers.

Greatest Common Denominators: This time the problem is $2/4 + 2/9$. The LCM of 9 and 4 is 36. You can change $2/4$ to $18/36$. Change $2/9$ to $8/36$. The problem then becomes $18/36 + 8/36$. The answer is $26/36$. However, can the fraction $26/36$ be further reduced? You need to find the greatest common denominator of 26 and 36. Use the `=GCD(26,36)` function, as shown in Fig. 453. As the answer is greater than 1, your $26/36$ answer can be reduced by dividing both the numerator and denominator by 2. $26/36$ is the same as $13/18$.

Part II

fx =GCD(C2:D2)		
C	D	E
First	Second	GCD
26	36	2

Fig. 453

Roman Numerals: The student is supposed to express the year that everyone in the family was born in Roman numerals. Use the `=ROMAN` function, as shown in Fig. 454.

fx =ROMAN(D2)	
D	E
Year	Roman
1960	MCMLX
1965	MCMLXV
1991	MCMXCI
1994	MCMXCIV
2001	MMI

Fig. 454

The Roman function will work with numbers from 1 to 3999. If you omit the second argument, you will get classic Roman numerals as shown above. Check the Excel help file for details on using simplified Roman Numerals.

Factorials: The last obscure function is the factorial function. To write 5 factorial, you use the number 5 followed by an exclamation mark: 5!. To calculate a factorial, you multiply the number by every number between itself and 1. So, 5! is 5x4x3x2x1, or 120.

Use the FACT function to calculate factorials, as shown in Fig. 455.

fx =FACT(D2)	
D	E
Number	Fact
5	120
7	5040
8	40320
10	3628800

Fig. 455

Summary: If you had Excel in seventh grade, math would have been a lot easier.

Functions Discussed: =LCM(); =GCD(); =ROMAN(); =FACT()