

Percentage Explained

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Calculating a Percentage

We work with percentages every time we shop with cash. Think about it. When you go to the store and buy a greeting card for \$3.95, the store adds RI sales tax and you end up paying \$4.23. The calculation was pretty simple:

$$\$3.95 \times 7\% = .28 \text{ (rounded)}$$

$$\$3.95 + .28 = \$4.23$$

In Excel this would be:

		A	B	
Amount	3.95	1	Amount	3.95
Tax Rate	0.07	2	Tax Rate	0.07
Sales Tax	0.28	3	Sales Tax	=B1*B2
Total	4.23	4	Total	=B1+B3

Determining the Original Amount Increased by a Percentage

Let's reverse the process. We just came back from the store, having spent \$156.89. How much of that was RI sales tax (assuming it was all taxable)? This requires a little algebra.

The sales tax was calculated by taking the sales amount (above example) and multiplying it by the tax rate. Then the sales tax was added to the sales amount to arrive at the total of \$156.89.

$$156.89 = X * .07 + X$$

$$156.89 = 1.07 * X$$

Divide both sides by 1.07

$$X = 156.89 / 1.07$$

$$X = 146.63$$

RI Sales Tax was 156.89 minus the sales amount of 146.63 or 10.26

In Excel this would be:

		A	B
Total	156.89	1	Total
Tax Rate	0.07	2	Tax Rate
Sales Amt	146.63	3	Sales Amt
Tax Amt	10.26	4	Tax Amt

Calculating Percent to Total

Keep with the sales theme, let's say as the manager of the store, we wanted to know what percentage of our sales today was in each of the following four categories:

Electronics	12,352.89
Furniture	8,672.01
Clothing	13,100.00
Books	5,128.16

First we need to calculate the total sales for the day by adding up the sales for the four categories.

		A	B
Electronics	12,352.89	1	Electronics
Furniture	8,672.01	2	Furniture
Clothing	13,100.00	3	Clothing
Books	5,128.16	4	Books
Total	39,253.06	5	Total

The total is 100% of the sales for today. The first question is, "What percentage of total is electronics?"

Let's think about our money system. A quarter is what portion of a dollar? We all know that a quarter is 25 cents or 1/4 of \$1.00. There are four quarters in one dollar. 25/100=.25 or a quarter is 25% of a dollar.

Using the same logic, $12,352.89/39,253.06=0.314699$ or 31% (rounded)

		A	B	C
Electronics	12,352.89	0.314699	1	Electronics
Furniture	8,672.01		2	Furniture
Clothing	13,100.00		3	Clothing
Books	5,128.16		4	Books
Total	39,253.06		5	Total

Now apply the same formula to the rest of the detail lines and to the total.

Electronics	12,352.89	0.31
Furniture	8,672.01	0.22
Clothing	13,100.00	0.33
Books	5,128.16	0.13
Total	39,253.06	1.00

	A	B	C
1	Electronics	12352.89	=B1/\$B\$5
2	Furniture	8672.01	=B2/\$B\$5
3	Clothing	13100	=B3/\$B\$5
4	Books	5128.16	=B4/\$B\$5
5	Total	=SUM(B1:B4)	=B5/\$B\$5

Notice the use of relative and absolute cell referencing to enable copying the formulas from C1 down through C5.

Another way of thinking about this problem can be demonstrated using a Pie Chart. The total is the whole pie, and the four categories are the pieces of the pie.

