For instance, let's say you are billed for your cell phone at a rate described by the following function (rule).

$$c(x) = 0.05x + 10$$

In other words the cost of your cell phone is $10.00 per month plus five cents for each minute you speak.

Let's suppose you spoke for twenty minutes, you would be billed $11.00 for the month.

Now, let's say you are taxed at 8% on that amount and that is added to your bill. Well, that's easy enough, I find the cost of the cell phone, take 8% of that number and add that sum to the bill. In our case, 8% of $11.00 is $0.88. So our bill is $11.88.

Now, if I had one thousand customers and I wanted to find their monthly bill. To accomplish that, I would have to find the monthly charge, then take 8% and add that to the monthly charge. While that's not hard work, there's two steps of computation that have to be completed.

Wouldn't it be nice if I could find a way of combining those functions into one rule – eliminating one of the computations?

Let's rewrite these two rules using mathematical notation. We'll let f describe the cost of the cell phone as previously described:

$$f(x) = 0.05x + 10$$

And g describe the amount of tax to be paid based upon that bill.

$$g(x) = .08x$$

As we have just done, to find the cost of the cell phone plus tax, I would have to plug into f the number of minutes I spoke, take that result and plug that into g to find the tax, and finally, add those two numbers together.

As you can see, for each customer I have to perform three computations, find f, find g, then find the sum of f and g.

Composition of functions allows me to combine functions when the second function depends upon the value of the first function. As we saw, g, the tax was dependent upon the monthly phone charge – f.