Interest

To Calculate Simple Interest:

First, let's cover the definitions for the terms that will be used in this section

Interest – this is the amount that is paid on the money deposited or borrowed

Principal – this is the original amount of money that was deposited or borrowed

Interest Rate – this is the percentage of the *principal* that will be paid

Simple Interest – this is the interest that is computed on the original *principal*

Formula:

Interest = Principal * Interest Rate * Time
I = P * R * T

Example:

You have borrowed $1,000 from the bank on a 1 year loan. You must pay the bank interest at an annual rate of 5%. What is the simple interest you must pay?

Our first step is to identify what information is given to us in the problem.

We know that: (1) the Principal (P) is $1000
(2) the time (T) is 1 year
(3) the interest rate (R) is 5% (or .05 in decimal form)

The next step is to substitute this information into our formula

I = P * R * T
I = $1000 * .05 * 1

Now, we simply multiply the amounts together

I = $ 50

So the amount of interest paid on the loan would be $50.

To calculate compound interest

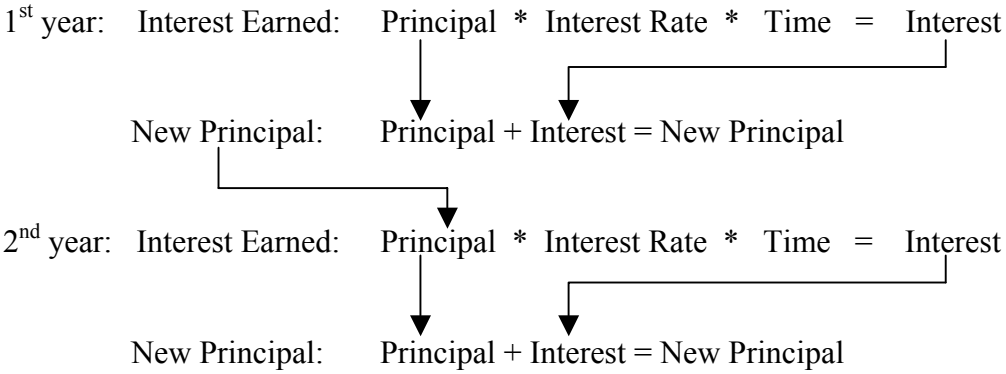
Compound Interest – is computed not only on the original principal but also on the interest already earned.

The interest can be calculated using any of the following compounding periods:

(1) Annually – interest is paid only once a year
(2) Semi-annually – interest is paid once every 6 months (2 times a year)
(3) Quarterly – interest is paid once every 3 months (4 times a year)
(4) Monthly – interest is paid once each month (12 times a year)
(5) Daily – interest is paid every day (365 times a year)

So with compound interest after each compounding period the interest earned is added to the principal. This amount then becomes the principal for the next compounding period.

We can calculate the interest using the same formula that was used for simple interest as follows:



We would keep repeating this process for each year. But as you can see, calculating the compound interest this way can be a long and tedious process. Therefore, to make it easier and faster to calculate compound interest there are tables that can be used to simplify these calculations. These tables can be found in the appendix of your textbook. A small portion of one of these tables is shown below.

Interest compounded annually

	4%	5%	6%
1 year	1.04000	1.05000	1.06000
5 years	1.21665	1.27628	1.33823
10 years	1.48024	1.62890	1.79085

To find the compound interest using the tables:

(1) You will use the interest rate and the length of time to find the correct interest factor.
(2) You will multiply the original principal by the interest factor

New Principal = Original Principal * Interest Factor

(3) Now you must subtract the original principal from the new principal

Interest earned = New Principal – Original Principal

Example:

$100 is invested for 5 years at an annual interest rate of 5% compounded annually. How much interest will we have earned after 5 years?

Our first step is to identify what information is given to us in the problem.

We know that: (1) the principal is $100
(2) the time is 5 years
(3) the interest rate is 5%
(4) the interest is compounded annually

Next we will use the tables to find the correct interest factor to use

Interest Rate ↓

Length of time →

	4%	5%	6%
1 year	1.04000	1.05000	1.06000
5 years	1.21665	**1.27628**	1.33823
10 years	1.48024	1.62890	1.79085

1.27628 is our factor since this is where our interest rate and time intersect.

Now we substitute our figures into the formula

New Principal = Original Principal * Interest Factor
New Principal = $100 * 1.27628
New Principal = $127.63 (round off to the nearest cent)

Interest Earned = New Principal – Original Principal
Interest Earned = $127.63 - $100
Interest Earned = $27.63