

## Compound Interest

The compound interest formula that banks use, when the interest is compounded continually (instead of yearly or quarterly or monthly), is an exponential function too. We are going to look at it, as well as review the regular formula for compound interest, which you probably have seen before in other math classes.

### Formulas for Compound Interest

**P = principal (what you start with)**

**t = number of years**

**A = balance after t years**

**r = annual rate of interest (as a decimal)**

**n = number of compounding periods per year**

**When compounded n times per year:**

$$A = P \left( 1 + \frac{r}{n} \right)^{nt}$$

**When compounded continuously:**

$$A = Pe^{kt}$$

It is interesting to me that banks continuously tout the advantages of continuous compounding interest, but if you look at the difference in what you earn when it is compounded quarterly and when it is compounded continuously, there is really a very slight difference (unless you have millions in the bank, which just goes to show that the old saying "it takes money to make money" has some truth to it!).