Compound Interest

Compound interest is an application of exponential growth, $y = ab^x$. We have the same equation, written differently, and with different variables because its being used in a different content.

$$A = P(1 + r)^t$$

In compound interest problems, "A" represents the amount in the account, "P" represents the initial principal or investment, "r" the interest rate, and "t" time in years. So everything is the same except the variables.

Now the fact is most banks don't figure interest on a yearly basis. So, we need to tweak the equation $A = P(1 + r)^t$. So, if you were receiving 12% interest per year being compounded monthly, you would be earning 1% per month and the interest would be figured 12 times.

So the equation for compound interest is: $A = P(1 + \frac{r}{n})^{nt}$

So, looking at that "new" formula, r is replaced with $\frac{r}{n}$, $\frac{r}{n}$ is the interest rate received for each interest period. ***t*** was replaced with ***nt,*** is the number of times the interest will be compounded.

Example Juan's dad invested $14,000 at 6% per year compounded monthly. How much money will be in his dad's account after 10 years.

Using the formula; $A = P(1 + \frac{r}{n})^{nt}$

$P = 14{,}000$, $r = .06$ and $n = 12$

$t = 10$

$$A = 14{,}000(1 + \frac{.06}{12})^{12(10)}$$

$$A = 14{,}000(1.005)^{120}$$

$$A \approx \$25{,}471$$

In this problem, his interest rate per month is .005 or 1/2%. His interest will be compounded 12 times per year for 10 years.