Before we look at 7-2...

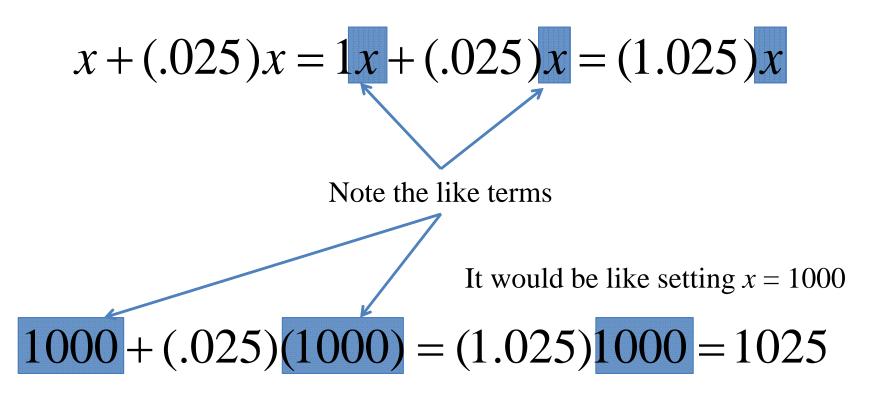
A few more examples from 7-1

 $3^{2x} = 27^{x-1}$  $3^{2x} = 2^{x-1}$  $3^{2x} = (3^3)^{x-1}$  $\ln 3^{2x} = \ln 2^{x-1}$  $3^{2x} = 3^{3x-3}$  $2x \ln 3 = (x-1) \ln 2$ 2x = 3x - 3 $2x \ln 3 = x \ln 2 - \ln 2$  $2x \ln 3 - x \ln 2 = -\ln 2$ x = 3 $x(2\ln 3 - \ln 2) = -\ln 2$  $x = \frac{-\ln 2}{2\ln 3 - \ln 2}$ 

If you start with \$1000 in an account and you increase it by 2.5%

$$(1.025)1000 = 1025$$

How did I do this?



If you start with \$1000 in an account and you are paid 2.5% interest once every year...

## 1000 + (.025)(1000) = (1.025)1000 = 1025

## 1025 + (.025)(1025) = 1025(1.025) = 1050.63

So our expression for increasing this account by 2.5% would be written like  $S = 1000(1.025)^t$  this:

And a general equation could be written like this:  $S = P(1+r)^{t}$ 

In this case, P is the principal or starting amount, r is the percentage written as a decimal and t is time measured in years

If your 2.5% were compounded monthly, then it would be 2.5% divided by 12 and applied 12 times a year

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

In this case, r is the percentage written as a decimal, n is the number of times per year that the interest is compounded and t is time measured in years

So after one year... 
$$y = 1000 \left(1 + \frac{.025}{12}\right)^{12}$$

## *e* = 2.718281828459...

This number is a lot like  $\pi$  in that it neither repeats nor terminates

$$y = y_0 e^x$$

This is used to measure what is called "continuous" growth which is when the time interval is too small to be measured

$$P = P_0 e^{rt}$$

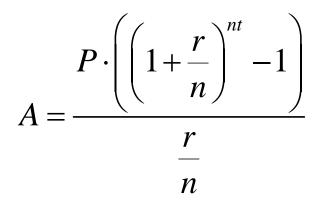
Refers to a situation in which a certain amount of money  $P_0$  is compounded continuously

An annuity is an account a specific amount is paid periodically (monthly, weekly, etc.) instead of just one principal payment as with compound interest accounts. Annuities take two forms savings and loans.

Annuity (Savings): 
$$A = \frac{P \cdot \left( \left( 1 + \frac{r}{n} \right)^{nt} - 1 \right)}{\frac{r}{n}}$$

Annuity (Loan): 
$$A = \frac{P \cdot \left(1 - \left(1 + \frac{r}{n}\right)^{-nt}\right)}{\frac{r}{n}}$$

## Annuity (Savings):



A is the amount saved or the amount still owed

**P** is the periodic payment amount

*r* is the annual percentage rate, *n* is number of annual payments

Annuity (Loan):

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

*t* is time in years

Try applying these formulas to Assignment 7-2 before our next class