Before we look at 7-2…

A few more examples from 7-1

$$3^{2x} = 27^{x-1}$$

$$3^{2x} = \left(3^3\right)^{x-1}$$

$$3^{2x} = 3^{3x-3}$$

$$2x = 3x - 3$$

$$x = 3$$

$$3^{2x} = 2^{x-1}$$

$$\ln 3^{2x} = \ln 2^{x-1}$$

$$2x \ln 3 = (x-1)\ln 2$$

$$2x \ln 3 = x \ln 2 - \ln 2$$

$$2x \ln 3 - x \ln 2 = -\ln 2$$

$$x(2\ln 3 - \ln 2) = -\ln 2$$

$$x = \frac{-\ln 2}{2\ln 3 - \ln 2}$$

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

$$(1.025)1000 = 1025$$

How did I do this?

$$x + (.025)x = 1x + (.025)x = (1.025)x$$

Note the like terms

It would be like setting $x = 1000$

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

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 this:

$$S = 1000(1.025)^t$$

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 π 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

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

P is the periodic payment amount

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

t is time in years

Annuity (Loan):

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

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