Day 14 is Thursday, September 27, 2012

Continuing Section 4-1

Three Different Kinds of Bank Interest

Simple Interest: $A = P(1 + rt)$

Periodically Compounded Interest: $A = P\left(1 + \frac{r}{m}\right)^{m \cdot t}$

Continuously Compounded Interest: $A = Pe^{(rt)}$

Today Problems involving the formula $A = Pe^{(rt)}$

Observe the equation. $A = Pe^{(rt)}$

expresses a relationship between A, P, r, t

The equation is solved for A

We can solve this equation for the other letters.

Solve for P

$$A = Pe^{(rt)}$$

Divide both sides by $e^{(rt)}$

$$\frac{A}{e^{(rt)}} = P$$

Solve original equation for r

$$A = Pe^{(rt)}$$

Divide by P

$$\frac{A}{P} = e^{(rt)}$$

take ln( ) of both sides

$$\ln\left(\frac{A}{P}\right) = \ln\left(e^{(rt)}\right)$$

$$\ln\left(\frac{A}{P}\right) = rt$$

Divide by t

$$\frac{\ln\left(\frac{A}{P}\right)}{t} = r$$

Solve Original equation for t

$$A = Pe^{(rt)}$$

$\vdots$ Same steps as in previous example

$$\ln\left(\frac{A}{P}\right) = rt$$

Divide by r

$$\frac{\ln\left(\frac{A}{P}\right)}{r} = t$$

Summary

$A = Pe^{(rt)}$ Solved for A

$P = \frac{A}{e^{(rt)}}$ Solved for P

$r = \frac{\ln(A/P)}{t}$ Solved for r

$t = \frac{\ln(A/P)}{r}$ Solved for t

Remark: Doing Math "in place" is a bad idea.

- unreliable
- impossible to check
- impossible to read

Example Solve this equation for r

$$\frac{\ln\left(\frac{A}{P}\right)}{t} = \frac{Pr}{P}$$