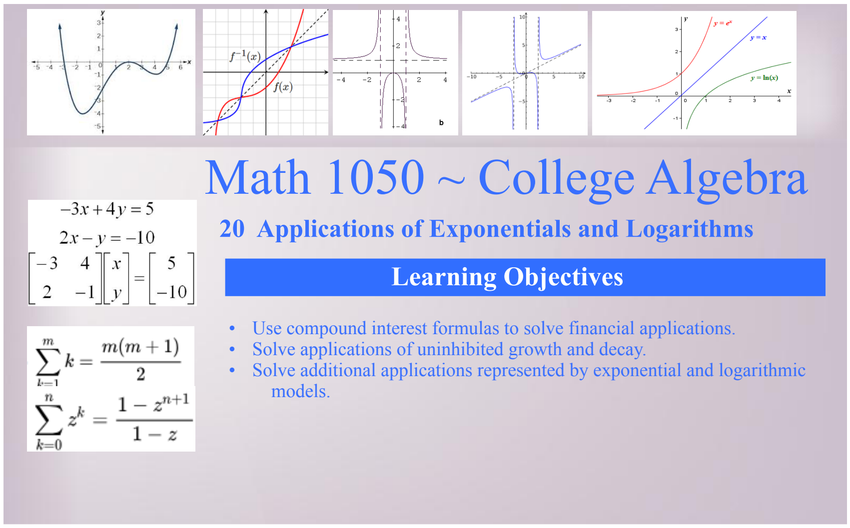

Simple, Compound and Continuously Compounded Interest

Ex 1: If you invest \$100 at a yearly interest rate of 5%, show how it will grow during the first five years.

Simple Interest | Compound Interest

Ex 2: How much must you invest at age 40 so that you will have a million dollars by the time you retire at 70? Assume an interest rate of 7% compounded annually.

In general, the formula for compound interest is $A = P\left(1 + \frac{r}{n}\right)^{nt}$

A = balance after t years

P = principal

r = annual interest rate

t = number of years

n = number of times it is compounded per year

Ex 3: Show the difference between compounding one time per year and twelve times per year when investing $1000 at 5% interest for 10 years.

Ex 4: What if the compounding on example 3 is continuous?

<u>Exponential Growth and Decay</u>

$A(t) = A_0 e^{kt}$ is the general formula for the exponential growth or decay of a substance.

Ex 5: The Half-life of radium (^{226}R) is 1620 years. What percent of the radium will still be present after 150 years?

Ex 6: A certain strain of dangerous bacteria is known to grow from 1000 to 5000 in 5 hours. Assume it grows according to the formula above.

a) Determine k, the growth constant and find a formula for the growth, $A(t)$.

b) When will the number present be 12,000?

Ex 7: A car that is priced at \$25,000 new, is worth \$15,000 after two years.

a) Find the linear model of depreciation. $V = mt + \boldsymbol{b}$

b) Find the exponential model of depreciation. $V = ae^{kt}$

c) Sketch a graph of the two models.

d) Determine the value of the car at the end of five years for each of the models.