6-5 Exponential Growth and Decay

EXPONENTIAL GROWTH

$$y = a(1 + r)^t$$

y = ouput / final amount
a = starting amount / initial value
r = growth rate (* decimal)
t = input / time
(1+r) = growth factor

EXAMPLE:

The original value of a painting is $9,000 and the value increases by 7% each year. Write an exponential growth function to model this situation. Then find the painting's value after 15 years.

$y = a(1+r)^t$

$y = 9000(1+0.07)^t$

$y = 9000(1.07)^{15}$

$y = \$24,831.28$

EXPONENTIAL DECAY

$$y = a(1 - r)^t$$

y = output / final amount
a = starting amount / initial value
r = decay rate (* decimal)
t = input / time
(1-r) = decay factor

EXAMPLE:

The population of a town is decreasing at a rate of 3% per year. In 2000 there were 1700 people. Write an exponential decay function to model this situation. Then find the population in ~~2012~~ 2012.

$y = a(1-r)^t$

$y = 1700(1-0.03)^t$

$y = 1700(0.97)^t$

$y = 1700(0.97)^{12}$

$y = 1180$ people