Exponential Functions

Chapter 6

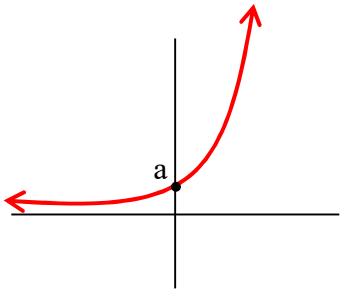
Exponential functions have the form: $y = a(b)^x$

a = y-intercept

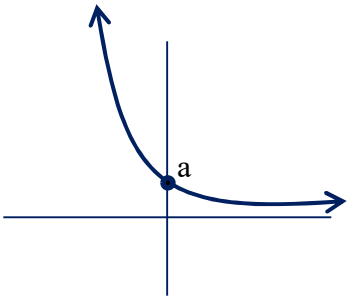
b = base

If the base is greater than 1, the function increases.

If the base is between 0 and 1, the function decreases.



b >1
Exponential growth



0 < b <1
Exponential decay

Growth Functions

The formula for exponential growth can be written like this:

Amount = Starting amount $(1 + \text{growth rate})^t$

Amount = Total number at time t
Starting amount = The number of things you started with
Growth rate = Can be written as a fraction (1/4) or a decimal percent (12% = 0.12)
t = time

For example, if there are 40 ducks on a lake and the population of ducks increases by $\frac{1}{5}$ every year, the function that models this is: Amount of ducks = $40\ (1 + \frac{1}{5})^t$.

Decay Functions

The formula for exponential decay can be written like this:

Amount = Starting amount $(1 - \text{decay rate})^t$

Amount = Total number at time t
Starting amount = The number of things you started with
Decay rate = Can be written as a fraction (1/4) or a decimal percent (12% = 0.12)
t = time

For example, if a bar of soap weighs 200 grams and its weight decreases by 4% every time it is used, the function that models this is: Weight of soap = $200\ (1 - 0.04)^t$.