Exponential Functions

$$y = a(b)^x$$

Example:

Mitosis is a process of cell reproduction in which one cell divides into two identical cells. E. coli is a fast-growing bacterium that is often resoponsible for food poisoning in uncooked meat. It can reproduce itself in 15 minutes. If you begin with 100 E. coli bacteria, how many will there be in 1 hour?

Exponential growth

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

y = final amount
C = initial amount
r = rate (% in dec. form)
t = time

Example:

In 1971, there were 294,105 females participating in high school sports. Since then, that number has increased an average of 8.5% a year. What is a estimate of the number of female athletes in 2000.

Exponential Decay

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

y = final amount
C = initial amount
r = rate (% in dec. form)
t = time

The country of Latvia has been experiencing a 1.1% annual decrease in population. In 200, its population was 2,405,000. If the trend continues, predict Latvia's population in 2015.

Compounding interest

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

A = amount $ (ending $)
P = principle (initial $)
r = rate % (dec.)
t = # of years
n = # of times compounded each year.

Example:
Determine the amount of an investent if $250 is invested at an interest rate of 5.75% compounded quarterly for 40 years.