Exponential Growth and Decay

When the rate of change of a variable *y* is directly proportional to the value of *y*, the function *y = f(x)* is said to grow/decay exponentially.

A. Differential Equation for rate of change: $\frac{dy}{dt} = ky$

B. General Solution: $y = Ce^{kt}$

I. If $k > 0$, then exponential growth occurs.

II. If $k < 0$, then exponential decay occurs.

Exponential Growth:

$$\frac{dy}{dt} = ky \qquad\qquad y(t) = Ce^{kt}$$