Average Rate of Change & Secant Line

Average Rate of Change $= \frac{f(x_2)-f(x_1)}{x_2-x_1} = \frac{f(x_1)-f(x_2)}{x_1-x_2}$

Average Rate of Change is a single number indicating a rough amount computed for some measurablte entity that changes or varies with time.

A **Secant Line**, also simply called a secant, is a line passing through two points of a curve.

Therefore **slope of a secant line** is the same as the Average Rate of Change.

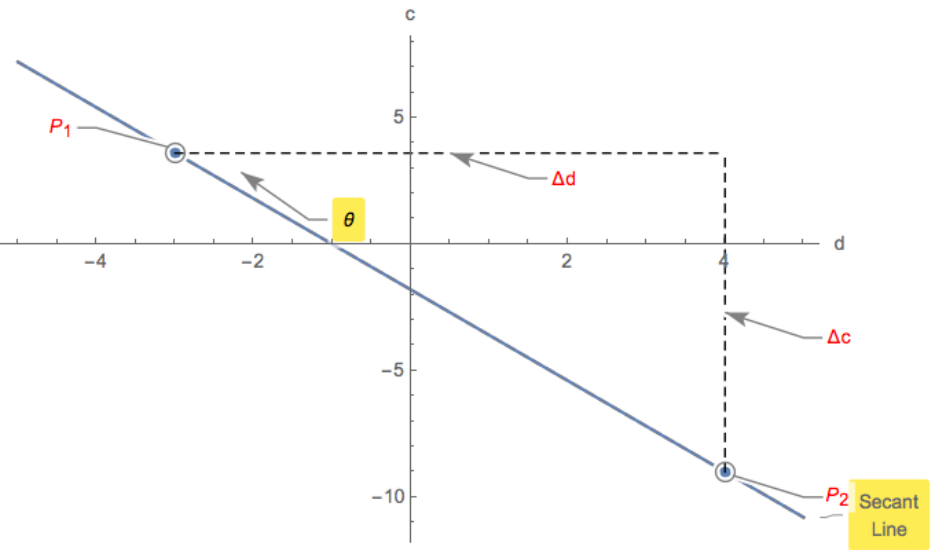
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

$$A = \frac{f(x)-f(x_1)}{x-x_1} \Rightarrow A(x-x_1) = f(x)-f(x_1) \Rightarrow A(x-x_1)+f(x_1) = f(x)$$

$$f(x) = Ax + (f(x_1) - Ax_1)$$

Example 1.

$c = -\frac{9d}{5} - \frac{9}{5}$ average between -3, 4



$$\Delta c = c(4) - c(-3) = -\frac{9(4)}{5} - \frac{9}{5} - \left(-\frac{9(-3)}{5} - \frac{9}{5}\right) = -\frac{63}{5}$$

Secant Slope $= \text{Tan}(\theta) = \frac{c(4)-c(-3)}{4-(-3)} = -\frac{9}{5}$

Average Rate of Change $= A = -\frac{9}{5}$

Secant Line: $c = -\frac{9}{5}d + \left(-\frac{9}{5}\right)$

c could be temperature of a cup of tea and d time.
c could be speed of a car and d time.
c could be gasoline amount and d distance traveled.