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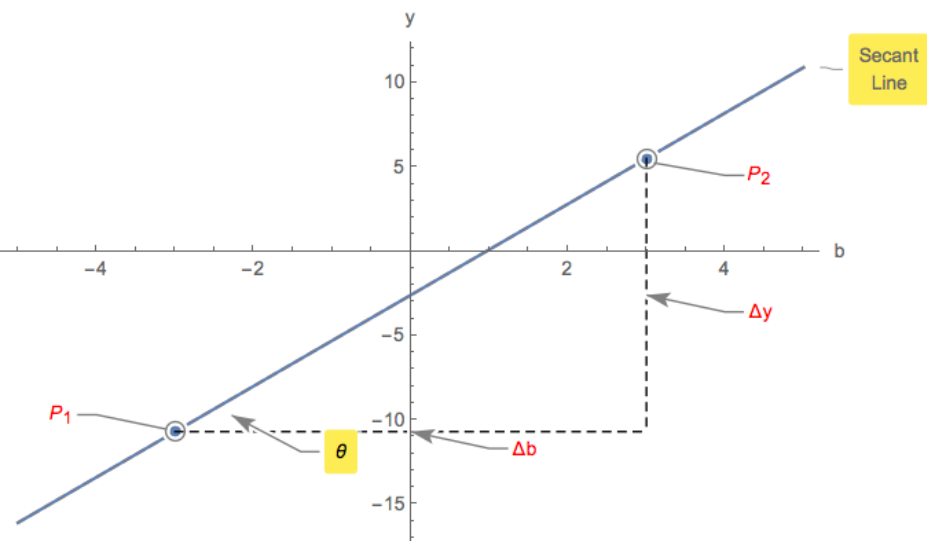
$A = \frac{f(x) - f(x_1)}{x - x_1} \Longrightarrow A(x - x_1) = f(x) - f(x_1) \Longrightarrow A(x - x_1) + f(x_1) = f(x)$

$$\boxed{f(x) = Ax + (f(x_1) - Ax_1)}$$

Example 1.

$y = \frac{27\,b}{10} - \frac{13}{5}$ average between −3, 3

$\Delta y = y(3) - y(-3) = \frac{27\,(3)}{10} - \frac{13}{5} - \left(\frac{27\,(-3)}{10} - \frac{13}{5} \right) = \frac{81}{5}$

Secant Slope $= \text{Tan}(\theta) = \frac{y(3) - y(-3)}{3 - (-3)} = \frac{27}{10}$

Average Rate of Change $= A = \frac{27}{10}$

Secant Line: $y = \boxed{\frac{27}{10}}\,b + \left(-\frac{13}{5} \right)$

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