Average Rate of Change & Secant Line

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

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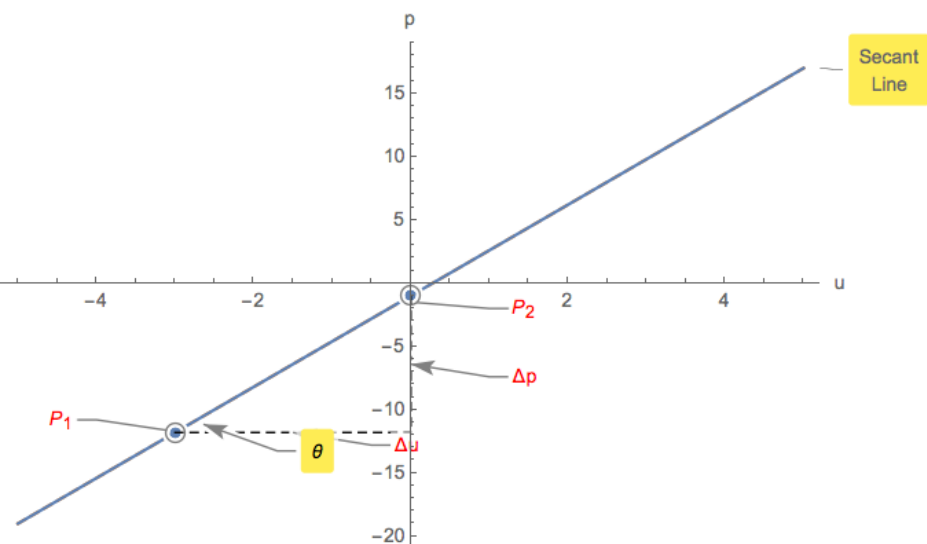
$A = \dfrac{f(x) - f(x_1)}{x - x_1} \Longrightarrow A(x - x_1) = f(x) - f(x_1) \Longrightarrow A(x - x_1) + f(x_1) = f(x)$

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

Example 1.

$p = \dfrac{18\,u}{5} - 1$ average between -3, 0

$\Delta p = p(0) - p(-3) = \dfrac{18\,(0)}{5} - 1 - \left(\dfrac{18\,(-3)}{5} - 1 \right) = \dfrac{54}{5}$

Secant Slope $= \mathrm{Tan}\,(\theta) = \dfrac{p(0) - p(-3)}{0 - (-3)} = \dfrac{18}{5}$

Average Rate of Change $= A = \dfrac{18}{5}$

Secant Line: $p = \boxed{\dfrac{18}{5}}\, u + (-1)$

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