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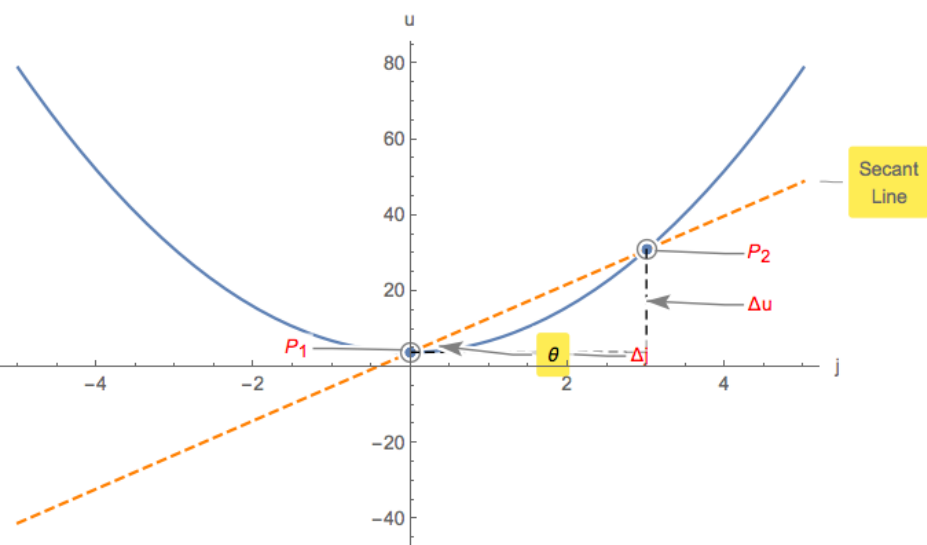
$A = \dfrac{f(x) - f(x_1)}{x - x_1} \Longrightarrow A(x - x_1) = f(x) - f(x_1) \Longrightarrow A(x - x_1) + f(x_1) = f(x)$

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

Example 1.

$u = 3\, j^2 + \frac{39}{10}$ average between 0, 3

$\Delta u = u(3) - u(0) = 3\,(3)^2 + \frac{39}{10} - \left(3\,(0)^2 + \frac{39}{10}\right) = 27$

Secant Slope $= \mathrm{Tan}(\Theta) = \dfrac{u(3) - u(0)}{3 - 0} = 9$

Average Rate of Change $= A = 9$

Secant Line: $u = 9\, j + \frac{39}{10}$

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