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.

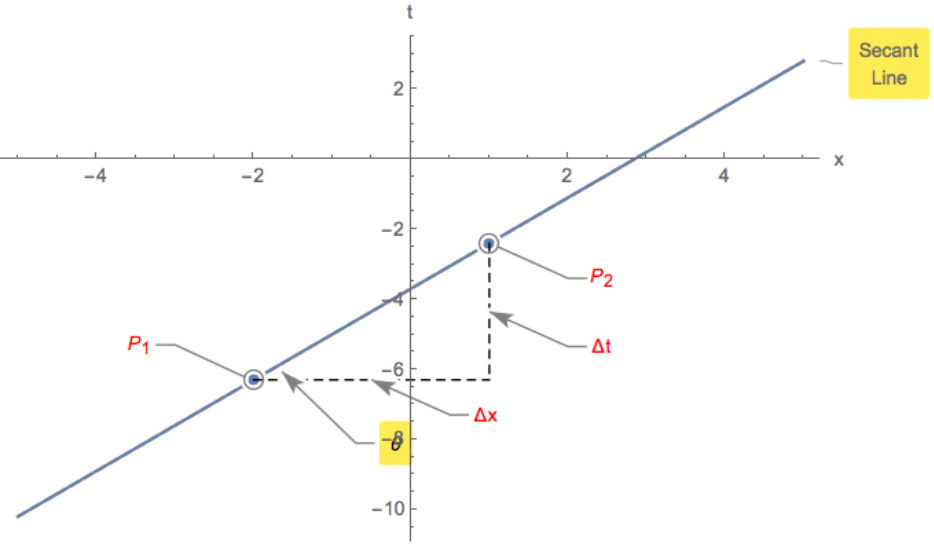
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$t = \frac{13x}{10} - \frac{37}{10}$ average between -2, 1



$\Delta t = t(1) - t(-2) = \frac{13(1)}{10} - \frac{37}{10} - \left(\frac{13(-2)}{10} - \frac{37}{10}\right) = \frac{39}{10}$

Secant Slope $= \text{Tan}(\theta) = \frac{t(1)-t(-2)}{1-(-2)} = \frac{13}{10}$

Average Rate of Change $= A = \frac{13}{10}$

Secant Line: $t = \frac{13}{10}x + \left(-\frac{37}{10}\right)$

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