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.

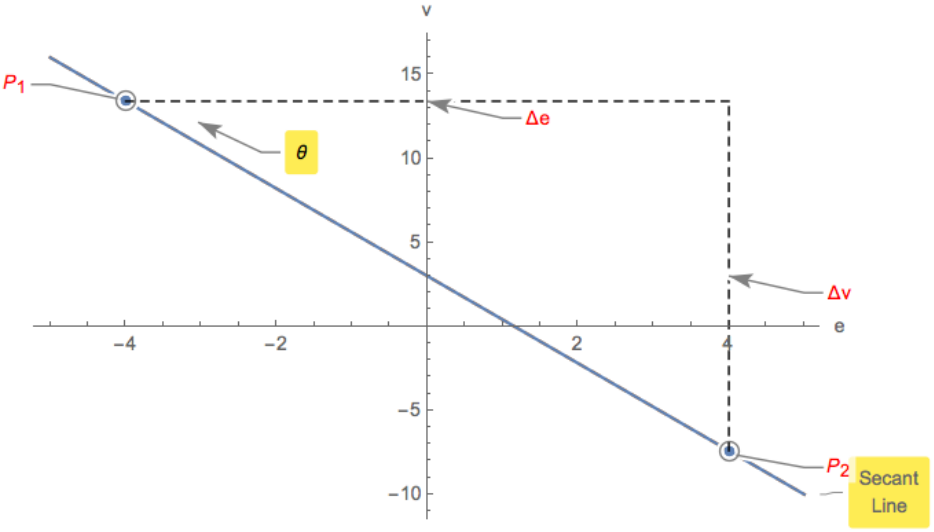
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$v = 3 - \frac{13\,e}{5}$ average between -4, 4



$$\Delta v = v(4) - v(-4) = 3 - \frac{13\,(4)}{5} - \left(3 - \frac{13\,(-4)}{5}\right) = -\frac{104}{5}$$

Secant Slope $= \text{Tan}(\theta) = \frac{v(4)-v(-4)}{4-(-4)} = -\frac{13}{5}$

Average Rate of Change $= A = -\frac{13}{5}$

Secant Line: $v = -\frac{13}{5}e + 3$

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