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.

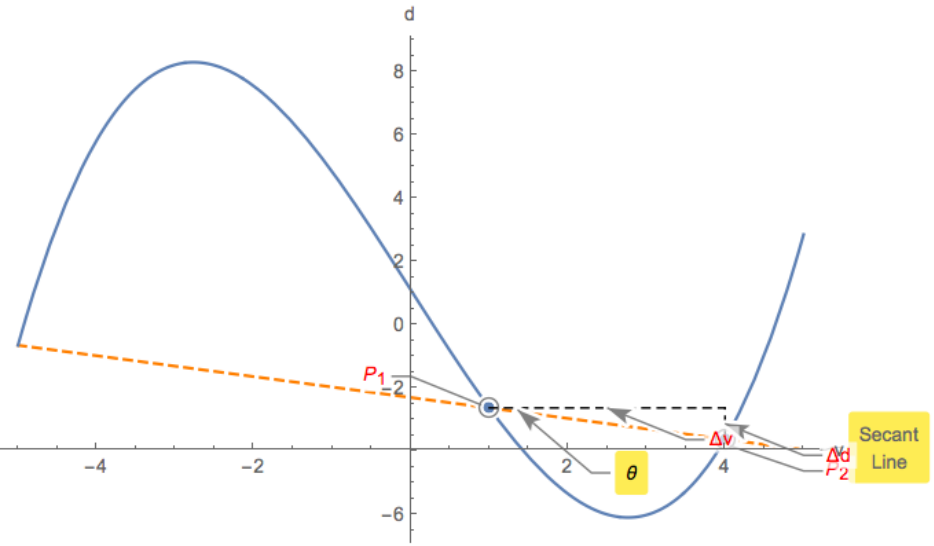
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$d = \frac{17\,v^3}{100} - \frac{39\,v}{10} + \frac{11}{10}$ average between 1, 4



$$\Delta d = d(4) - d(1) = \frac{17\,(4)^3}{100} - \frac{39\,(4)}{10} + \frac{11}{10} - \left(\frac{17\,(1)^3}{100} - \frac{39\,(1)}{10} + \frac{11}{10}\right) = -\frac{99}{100}$$

Secant Slope $= \text{Tan}(\theta) = \frac{d(4)-d(1)}{4-1} = -\frac{33}{100}$

Average Rate of Change $= A = -\frac{33}{100}$

Secant Line: $d = -\frac{33}{100}v + \left(-\frac{23}{10}\right)$

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