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.

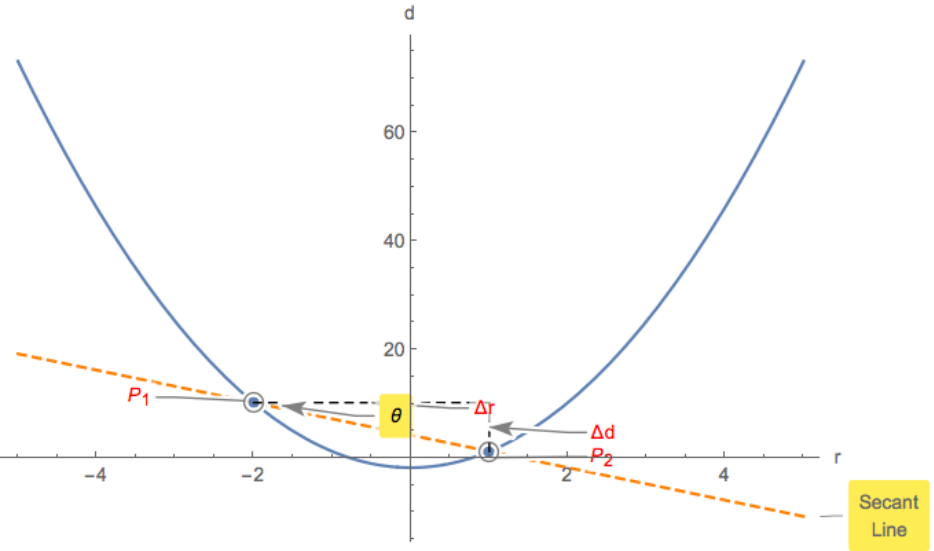
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$d = 3r^2 - \frac{9}{5}$ average between $-2, 1$



$$\Delta d = d(1) - d(-2) = 3(1)^2 - \frac{9}{5} - \left(3(-2)^2 - \frac{9}{5}\right) = -9$$

Secant Slope $= \text{Tan}(\theta) = \frac{d(1)-d(-2)}{1-(-2)} = -3$

Average Rate of Change $= A = -3$

Secant Line: $d = -3r + \frac{21}{5}$

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