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.

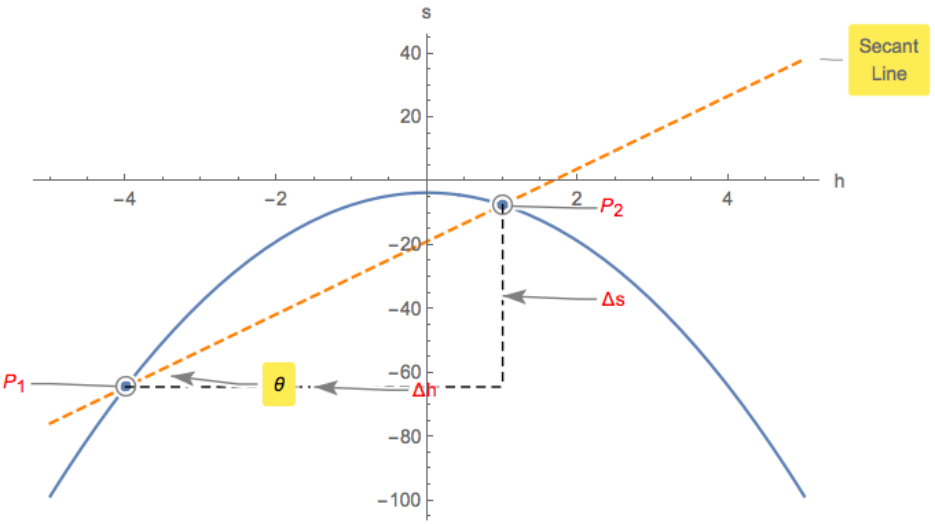
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$s = -\frac{19\,h^2}{5} - \frac{18}{5}$ average between -4, 1



$$\Delta s = s(1) - s(-4) = -\frac{19\,(1)^2}{5} - \frac{18}{5} - \left(-\frac{19}{5}\,(-4)^2 - \frac{18}{5}\right) = 57$$

Secant Slope $= \text{Tan}(\theta) = \frac{s(1)-s(-4)}{1-(-4)} = \frac{57}{5}$

Average Rate of Change $= A = \frac{57}{5}$

Secant Line: $s = \frac{57}{5}h + \left(-\frac{94}{5}\right)$

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