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.

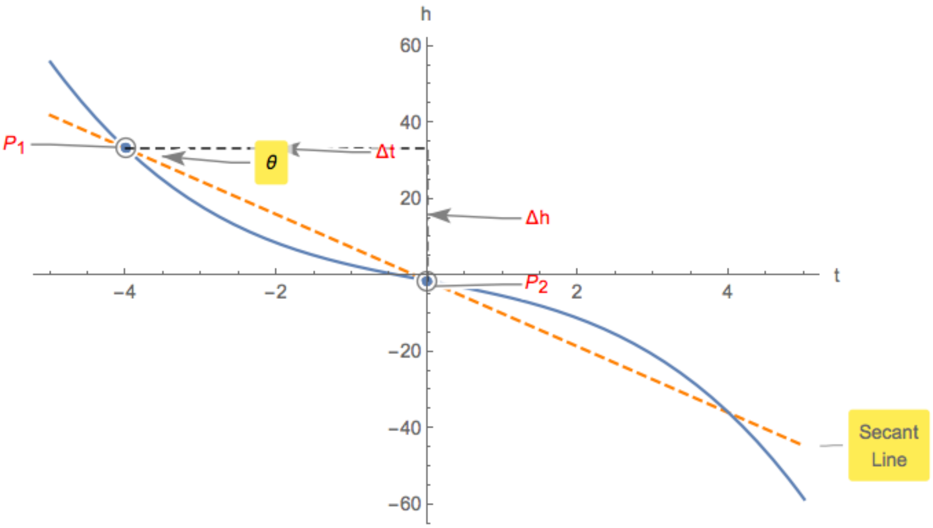
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$h=-\frac{31t^3}{100}-\frac{37t}{10}-\frac{7}{5}$ average between -4, 0



$\Delta h=h(0)-h(-4)=-\frac{31(0)^3}{100}-\frac{37(0)}{10}-\frac{7}{5}-\left(-\frac{31}{100}(-4)^3-\frac{37(-4)}{10}-\frac{7}{5}\right)=-\frac{866}{25}$

Secant Slope$=\text{Tan}(\theta)=\frac{h(0)-h(-4)}{0-(-4)}=-\frac{433}{50}$

Average Rate of Change$=A=-\frac{433}{50}$

Secant Line: $h=-\frac{433}{50}t+\left(-\frac{7}{5}\right)$

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