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.

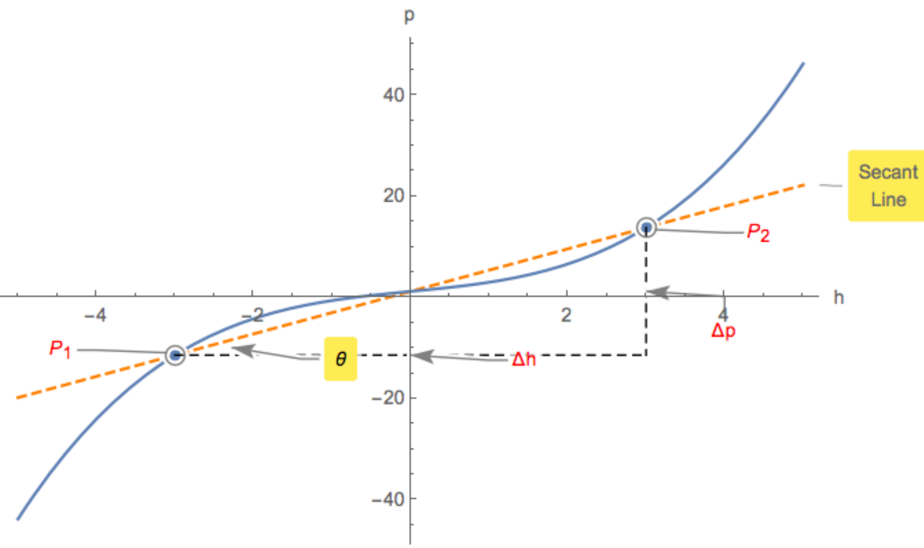
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$p=\frac{3h^3}{10}+\frac{3h}{2}+\frac{6}{5}$ average between -3, 3



$\Delta p=p(3)-p(-3)=\frac{3(3)^3}{10}+\frac{3(3)}{2}+\frac{6}{5}-\left(\frac{3(-3)^3}{10}+\frac{3(-3)}{2}+\frac{6}{5}\right)=\frac{126}{5}$

Secant Slope$=\text{Tan}(\theta)=\frac{p(3)-p(-3)}{3-(-3)}=\frac{21}{5}$

Average Rate of Change$=A=\frac{21}{5}$

Secant Line: $p=\frac{21}{5}h+\frac{6}{5}$

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