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.

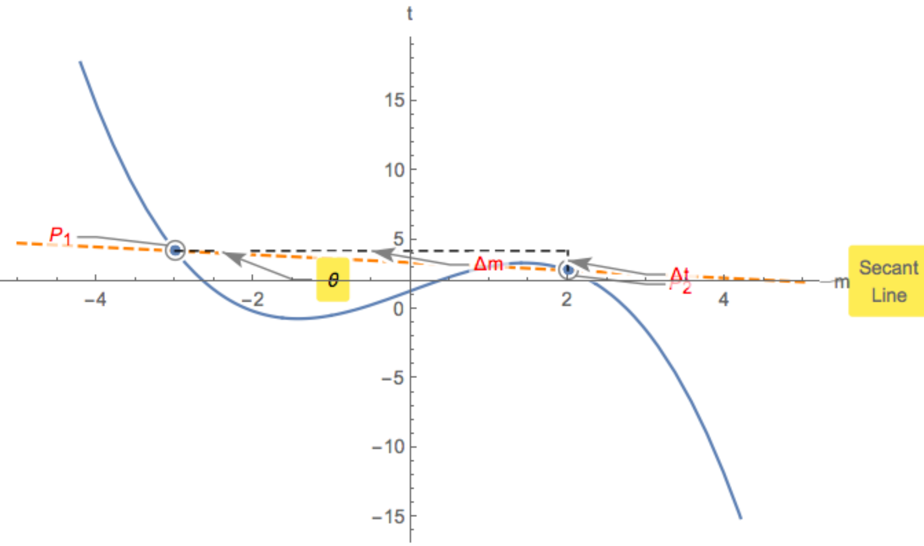
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$t=-\frac{17\,m^3}{50}+\frac{21\,m}{10}+\frac{13}{10}$ average between -3, 2



$\Delta t=t(2)-t(-3)=-\frac{17\,(2)^3}{50}+\frac{21\,(2)}{10}+\frac{13}{10}-\left(-\frac{17}{50}\,(-3)^3+\frac{21\,(-3)}{10}+\frac{13}{10}\right)=-\frac{7}{5}$

Secant Slope$=\text{Tan}(\theta)=\frac{t(2)-t(-3)}{2-(-3)}=-\frac{7}{25}$

Average Rate of Change$=A=-\frac{7}{25}$

Secant Line: $t=-\frac{7}{25}m+\frac{167}{50}$

t could be temperature of a cup of tea and m time.

t could be speed of a car and m time.

t could be gasoline amount and m distance traveled.