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.

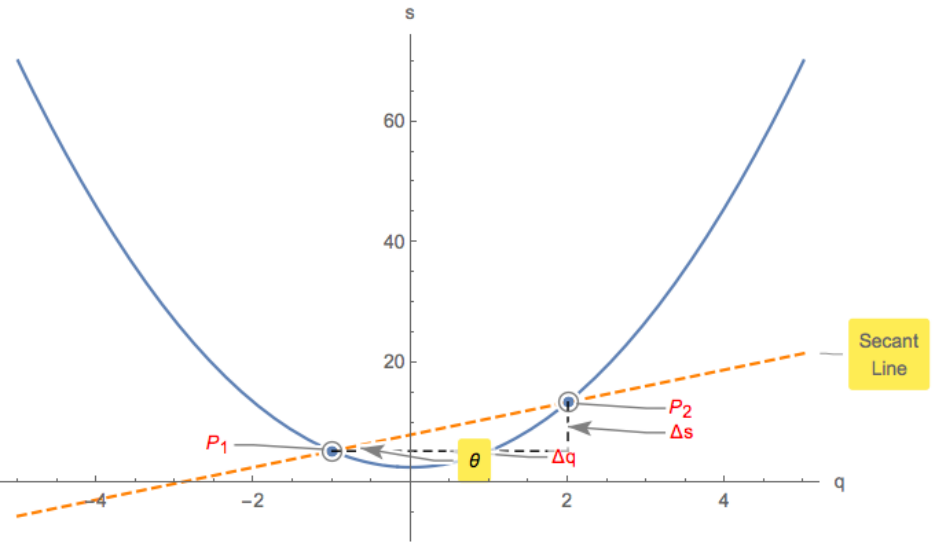
Equation for Secant Line, if **A** indicates Average Rate of Change while **f**(x) indicates horizontal axis value for secant line computes as follows:

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

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

Example 1.

$s = \frac{27\,q^2}{10} + \frac{13}{5}$ average between -1, 2



$$\Delta s = s(2) - s(-1) = \frac{27\,(2)^2}{10} + \frac{13}{5} - \left(\frac{27\,(-1)^2}{10} + \frac{13}{5}\right) = \frac{81}{10}$$

Secant Slope $= \text{Tan}(\theta) = \frac{s(2)-s(-1)}{2-(-1)} = \frac{27}{10}$

Average Rate of Change $= A = \frac{27}{10}$

Secant Line: $s = \frac{27}{10}q + 8$

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