Average Rate of Change & Secant Line

Average Rate of Change $= \dfrac{f(x_2)-f(x_1)}{x_2-x_1} = \dfrac{f(x_1)-f(x_2)}{x_1-x_2}$

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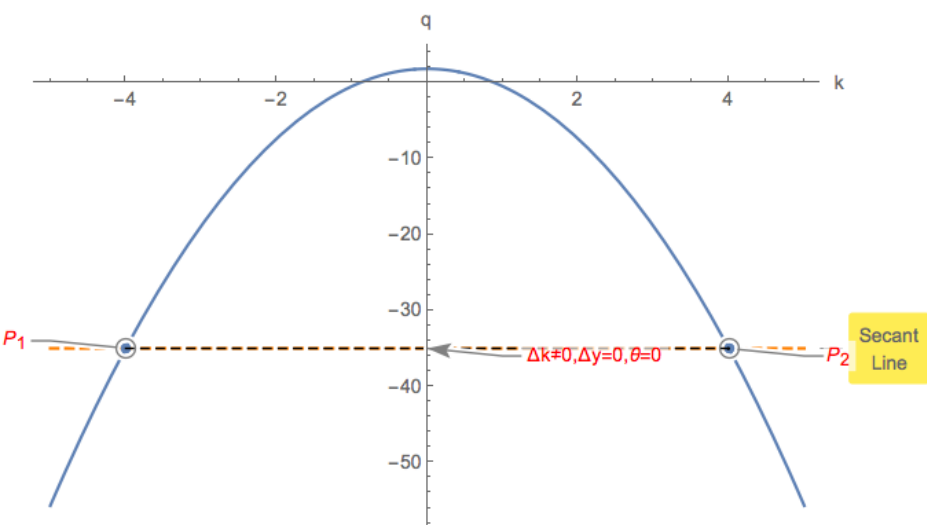
$A = \dfrac{f(x)-f(x_1)}{x-x_1} \Longrightarrow A(x-x_1) = f(x)-f(x_1) \Longrightarrow A(x-x_1)+f(x_1) = f(x)$

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

Example 1.

$q = \dfrac{9}{5} - \dfrac{23 \, k^2}{10}$ average between −4, 4

$\triangle q = q(4) - q(-4) = \dfrac{9}{5} - \dfrac{23 \, (4)^2}{10} - \left(\dfrac{9}{5} - \dfrac{23 \, (-4)^2}{10} \right) = 0$

Secant Slope $= \mathrm{Tan}(\theta) = \dfrac{q(4)-q(-4)}{4-(-4)} = 0$

Average Rate of Change $= A = 0$

Secant Line: $q = 0 \; k + (-35)$

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