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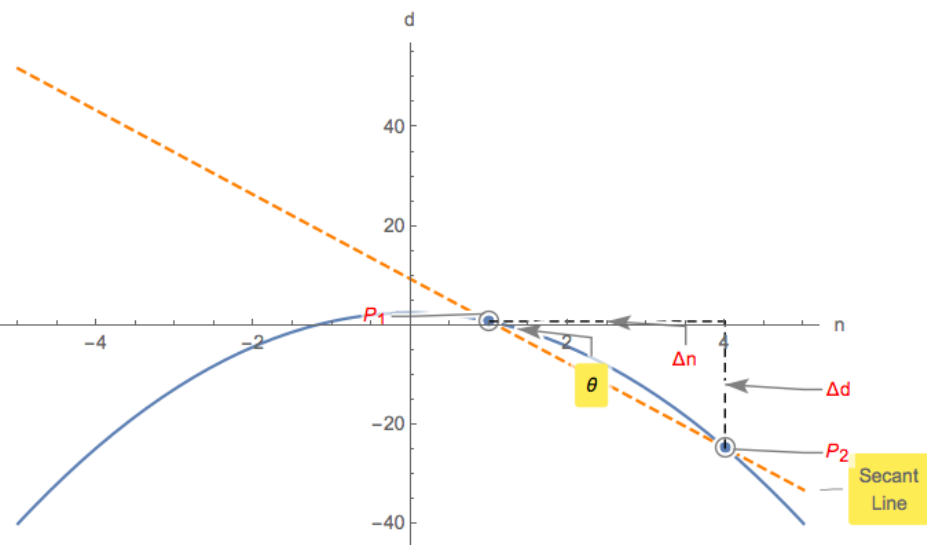
$A = \frac{f(x) - f(x_1)}{x - x_1} \Longrightarrow A(x - x_1) = f(x) - f(x_1) \Longrightarrow A(x - x_1) + f(x_1) = f(x)$

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

Example 1.

$d = \frac{5}{2} - \frac{17 n^2}{10}$ average between 1, 4

$\Delta d = d(4) - d(1) = \frac{5}{2} - \frac{17(4)^2}{10} - \left(\frac{5}{2} - \frac{17(1)^2}{10} \right) = -\frac{51}{2}$

Secant Slope $= \text{Tan}(\theta) = \frac{d(4) - d(1)}{4 - 1} = -\frac{17}{2}$

Average Rate of Change $= A = -\frac{17}{2}$

Secant Line: $d = -\frac{17}{2} n + \frac{93}{10}$

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