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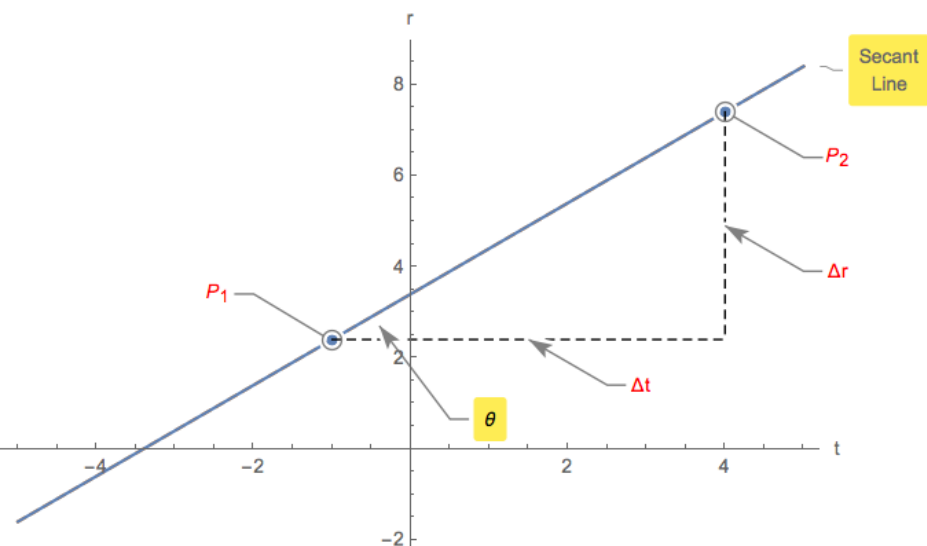
$A = \dfrac{f(x)-f(x_1)}{x-x_1} \Longrightarrow A(x-x_1) = f(x)-f(x_1) \Longrightarrow A(x-x_1)+f(x_1) = f(x)$

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

## Example 1.

$r = t + \dfrac{17}{5}$ average between $-1$, $4$



$\Delta r = r(4) - r(-1) = (4) + \dfrac{17}{5} - \left((-1) + \dfrac{17}{5}\right) = 5$

**Secant Slope**$= \mathrm{Tan}(\theta) = \dfrac{r(4)-r(-1)}{4-(-1)} = 1$

**Average Rate of Change**$= A = 1$

**Secant Line**: $r = 1\,t + \dfrac{17}{5}$

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