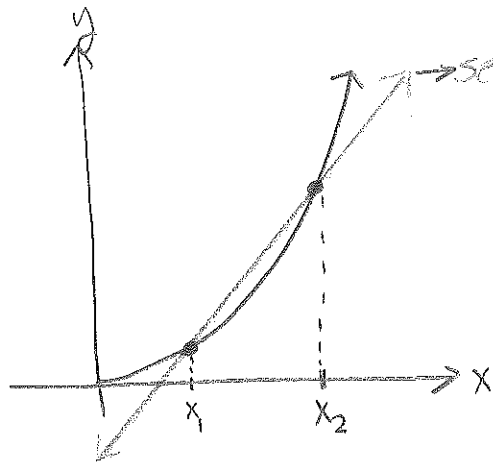


Why & how do we find the average rate of change (aroc)?

Roc is used for real life scenarios that can be modeled by $y = mx + b$. What if a real life scenario is modeled by a curve and not a line?

for non-linear graphs, find aroc on any given interval, $[x_1, x_2]$, by finding the slope of the secant line.



secant line: a straight line joining two points on a fnn.

$$\text{Aroc} = \text{slope of secant line} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

Find aroc given a function, $f(x)$

If $f(x) = x^2 - 2$, find the aroc on $[2, 4]$

remember aroc = $\frac{y_2 - y_1}{x_2 - x_1}$

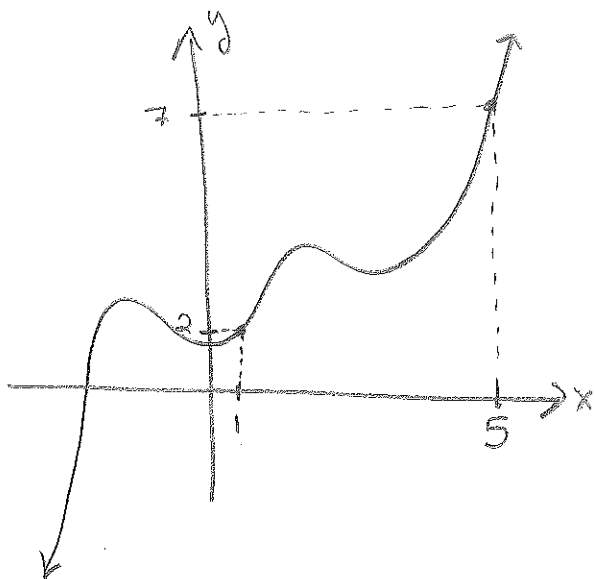
we have x_2 and x_1 , we need y_2 and y_1

$$f(2) = 2^2 - 2 = 4 - 2 = 2 \quad (2, 2)$$

$$f(4) = 4^2 - 2 = 16 - 2 = 14 \quad (4, 14)$$

$$\therefore \text{aroc} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{14 - 2}{4 - 2} = \frac{12}{2} = \boxed{6}$$

Find aroc given a graph



find aroc on $[1, 5]$

Note the coordinate points
for $x=1$, $x=5$

$(1, 2)$ and $(5, 7)$
 x_1, y_1 x_2, y_2

$$\text{aroc} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 2}{5 - 1} = \boxed{\frac{5}{4}}$$

Find aroc given a table of data

"x"	time	2009	2010	2011	2012	2013	2014
"y"	\$	5,000	5,114	6,727	9,810	14,125	23,412

find the aroc on $[2012, 2014]$
 $\downarrow x_1$ $\downarrow x_2$

$(2012, 9810)$, $(2014, 23412)$
 x_1 y_1 x_2 y_2

$$\text{aroc} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{23412 - 9810}{2014 - 2012} = \frac{13602}{2} = \boxed{\$6801/\text{yr}}$$

