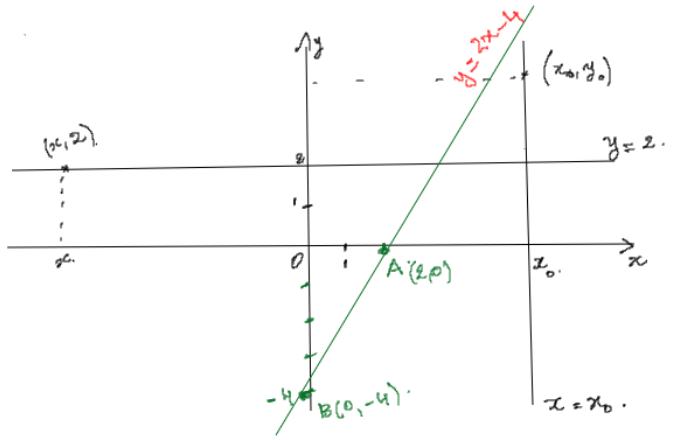
Equation of a line



An horizontal line. $y = b$.

A vertical line : $x = x_0$.

A line (that is not vertical) is : $y = mx + b$.

b : y-intercept. $(x = 0)$.

m : slope. $(m = 0 \Rightarrow$ horizontal line$)$

Ex. Sketch the line : $2x - y - 4 = 0$.

- choose two pts :

	x	y
B:	0	-4
A:	2	0

- Write the eqt : $y = mx + b$

$y = 2x - 4$.

Ex : Find the equation of the line with slope 2 and y-intercept -4.

We have $m = 2$ and $b = -4$.

Then $y = 2x - 4$.

Ex. Find the line passing through $A(2,0)$ and $B(0,-4)$.

Line : $y = mx + b$.

$y_A = m x_A + b$. ①

$y_B = m x_B + b$. ②

① − ② : $y_A - y_B = m(x_A - x_B)$ → $\boxed{m = \dfrac{y_A - y_B}{x_A - x_B}}$.

$m = \dfrac{0 - (-4)}{2 - 0} = \dfrac{4}{2} = 2 \longrightarrow m = 2$.

$x_B = 0 \longrightarrow y_B = -4 = m(0) + b \longrightarrow b = -4$.

The equation is : $y = 2x - 4$