2.1. Graphs of Equations

Thursday, August 30, 2018 11:01 AM

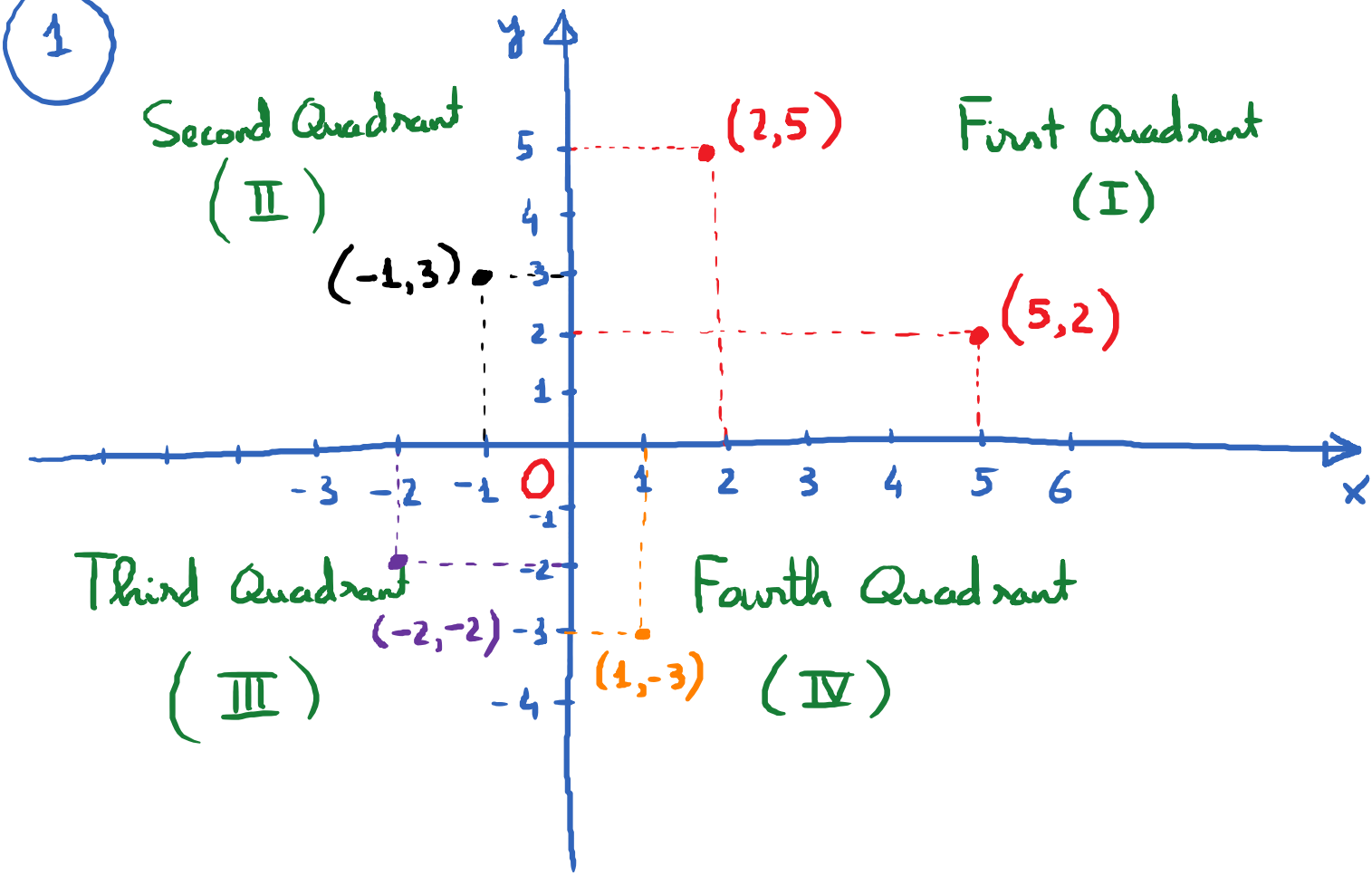
Objectives : (1) Plotting Ordered Pairs

(2) Solutions of Equations

(3) Graph Linear Equations

(4) Graph Nonlinear Equations

(1)



E.g. In which quadrant, if any, are the points $(-3,-1)$; $(5,-2)$; $(6,0)$; $(-1,4)$ located ?

$(-3,-1)$: (III)

$(5,-2)$: (IV)

$(6,0)$: x-axis

$(-1,4)$: (II)

-3 : x-coordinate

-1 : y-coordinate

(2) Solutions of Equations :

E.g. $4x - 3y = 12$

Is $(1,2)$ a solution of this equation ? NO.

— $(0,-4)$ — ? YES.

* Plug $x=1$; $y=2$ into the equation :

$$4\cdot(1) - 3\cdot(2) \stackrel{?}{=} 12$$

$$-2 \neq 12$$

* Plug $x=0$; $y=-4$: $4\cdot(0) - 3\cdot(-4) \stackrel{?}{=} 12$

$$12 = 12 \checkmark$$

(3) Graphs of Linear Equations

Process for graphing a linear equation:

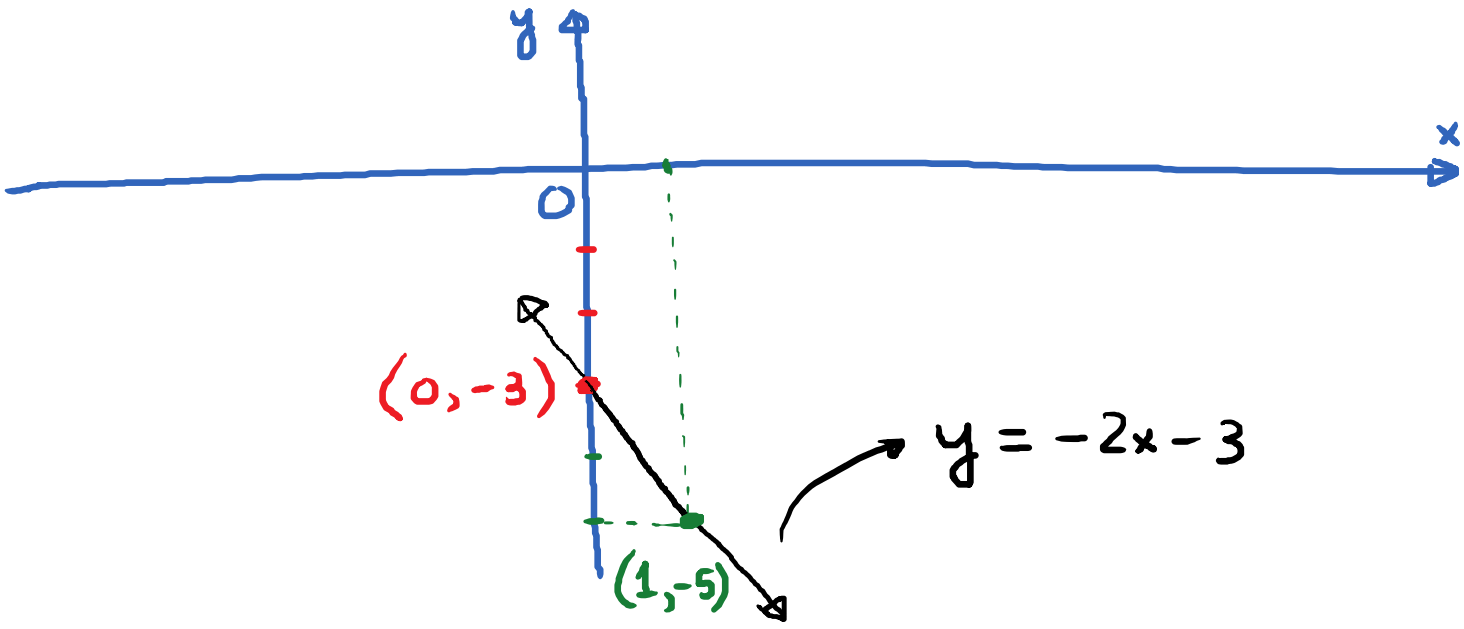
Step 1: Select a value for one variable and calculate the corresponding value of the other variable. Form an ordered pair that belongs to the line.

Step 2: Repeat step 1 to obtain the second ordered pair.

Step 3: Plot the ordered pairs and draw a straight line through them.

E.g. $y = -2x - 3$. Graph this!

x	$y = -2x - 3$	(x, y)
0	-3	$(0, -3)$
1	-5	$(1, -5)$

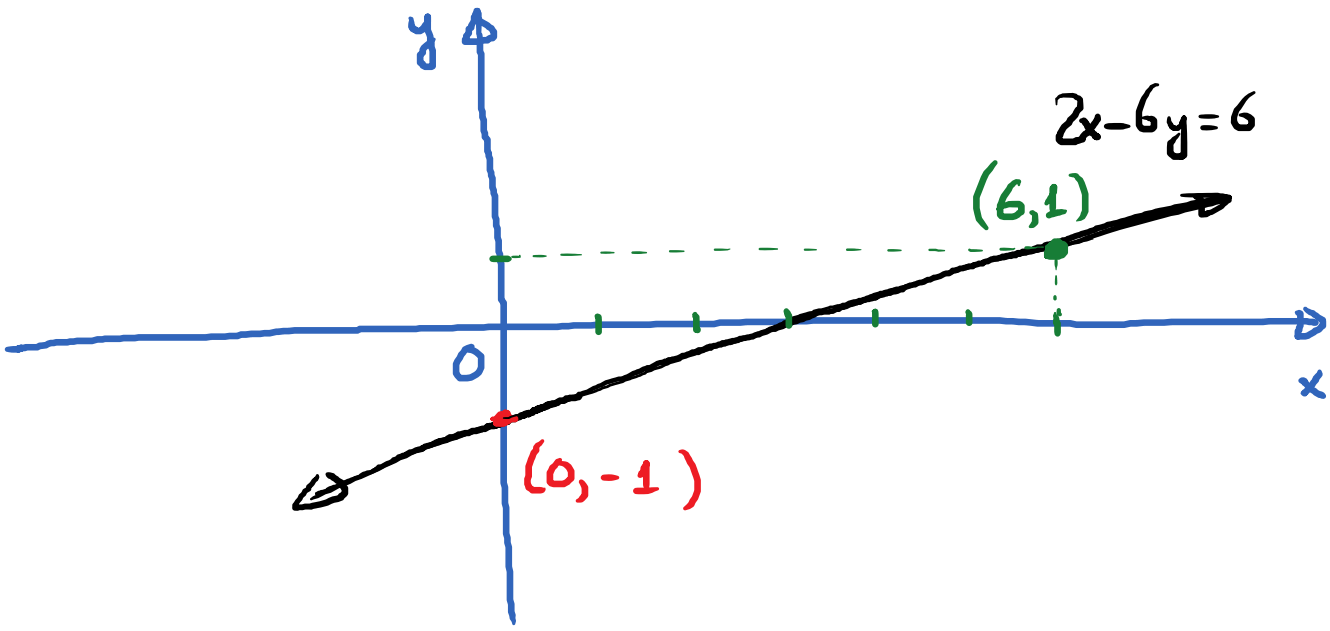


E.g. Graph $2x - 6y = 6$

Isolate y: $\dfrac{-6y}{-6} = \dfrac{-2x + 6}{-6}$

$$\boxed{y = \frac{1}{3}x - 1}$$

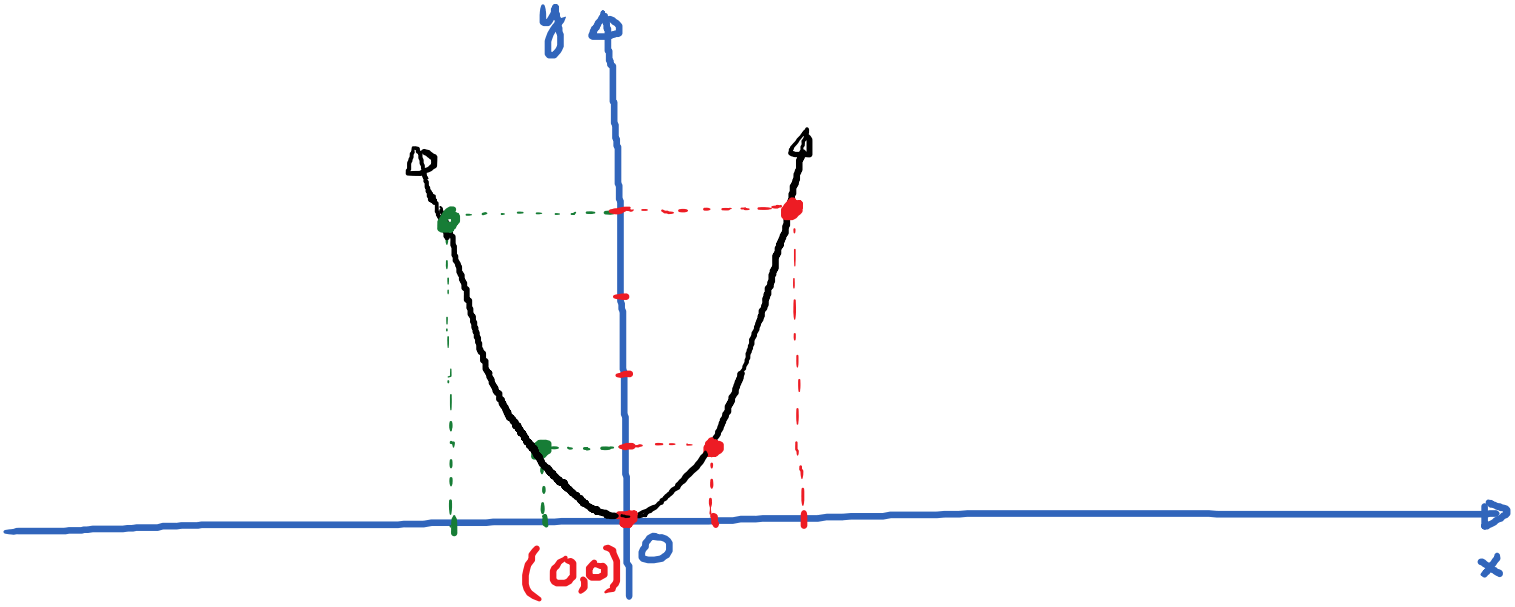
x	$y = \frac{1}{3}x - 1$	(x, y)
0	-1	$(0, -1)$
6	1	$(6, 1)$



(4) Basic Nonlinear Equations

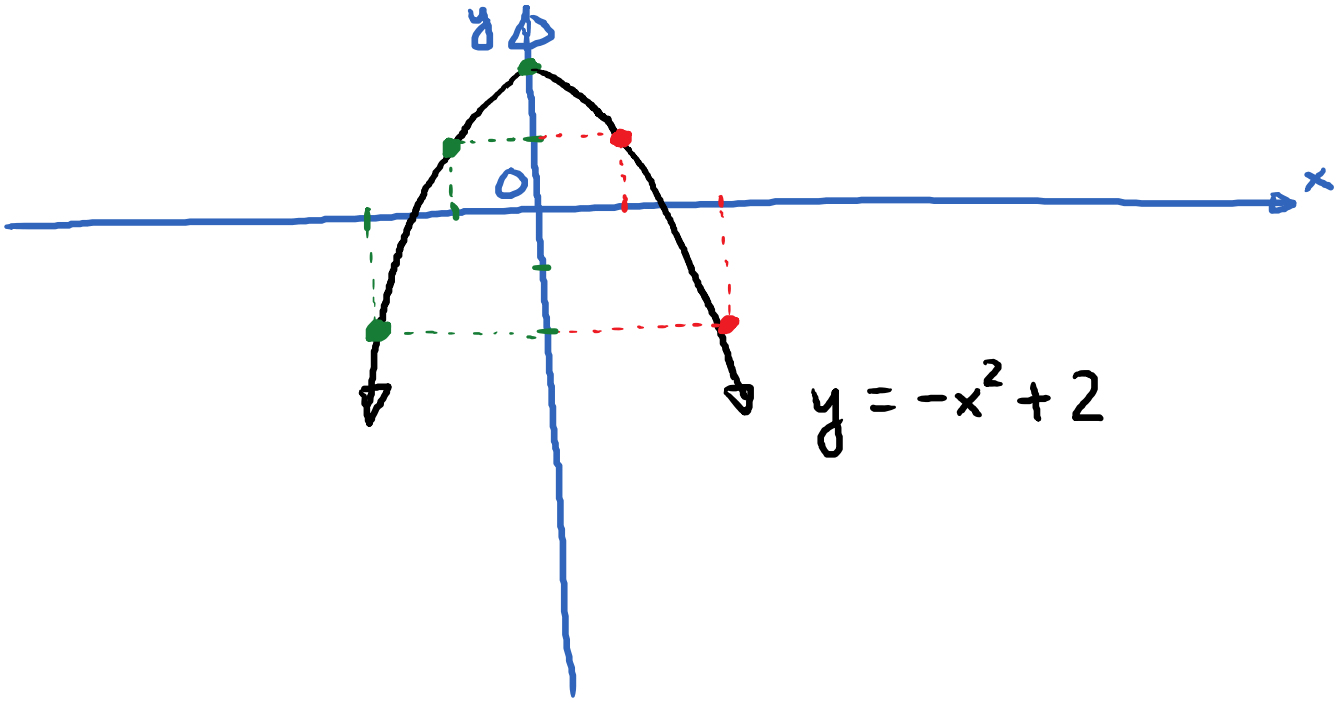
$y = x^2$

x	$y = x^2$	(x, y)
-2	4	$(-2, 4)$
-1	1	$(-1, 1)$
0	0	$(0, 0)$
1	1	$(1, 1)$
2	4	$(2, 4)$



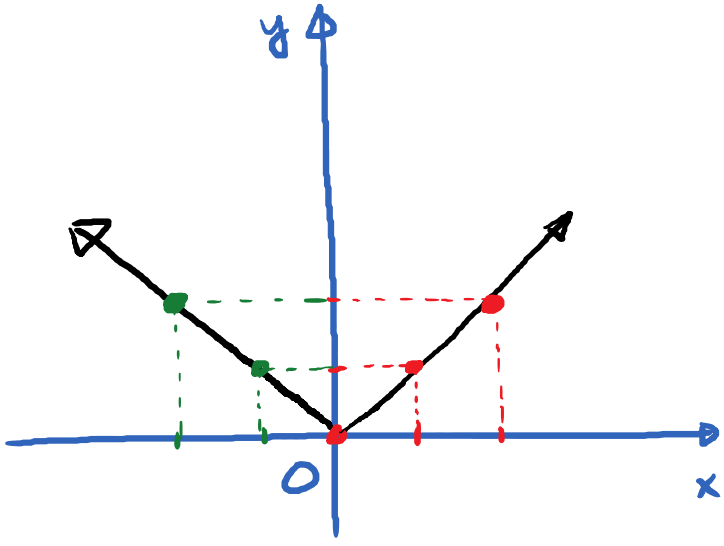
E.g. $y = -x^2 + 2$

x	$y = -x^2 + 2$	(x, y)
-2	-2	$(-2, -2)$
-1	1	$(-1, 1)$
0	2	$(0, 2)$
1	1	$(1, 1)$
2	-2	$(-2, 2)$



E.g. Graph : $y = |x|$

x	$y = \|x\|$	(x, y)
-2	2	(-2, 2)
-1	1	(-1, 1)
0	0	(0, 0)
1	1	(1, 1)
2	2	(2, 2)



E.g. Graph $y = -2|x|$

x	$y = -2\|x\|$	(x, y)
-2	-4	$(-2, -4)$
-1	-2	$(-1, -2)$
0	0	$(0, 0)$
1	-2	$(1, -2)$
2	-4	$(2, -4)$