4.3 Another Form of the Equation for a Linear Relation

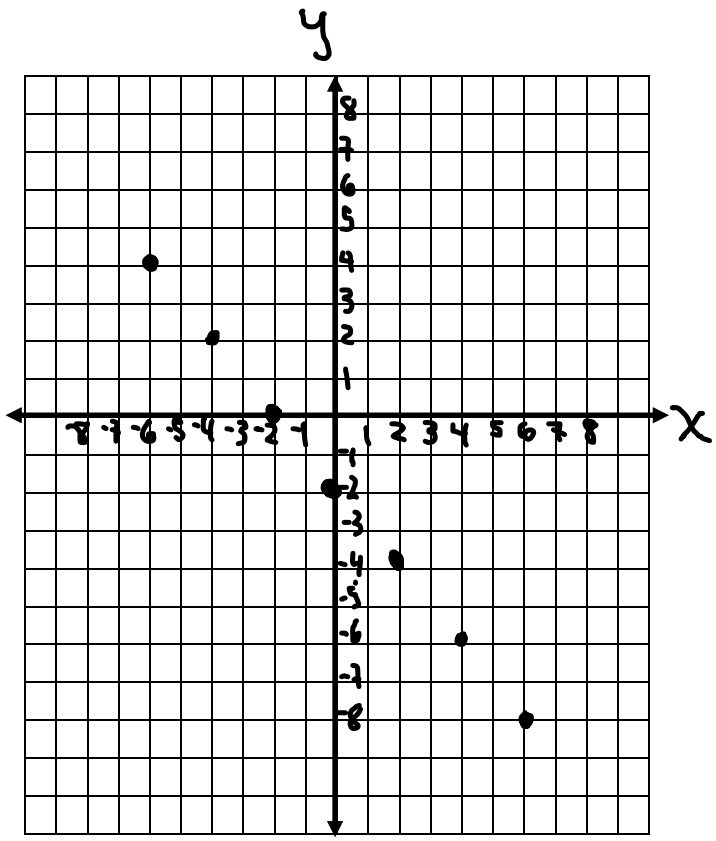
Example (1):

	X	y	
+2	-6	4	-2
+2	-4	2	-2
+2	-2	0	-2
+2	0	-2	-2
+2	2	-4	-2
+2	4	-6	-2
+2	6	-8	-2

What pattern do you see in the table?

It is a linear relation since there is a constant change in x (+2) that produces a constant change in y (-2).

Graph the data below.



The points lie on a straight line, so the relation is linear relation

So,

Then the linear relation is : $x + y = -2$

This equation has 2 variables on the left side of the equation.

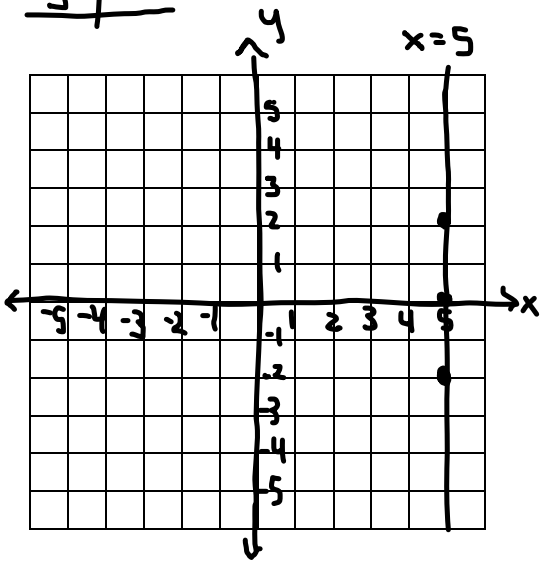
It illustrates another way to write the equation of a linear relation.

Example (2): For each equation below:
i) Graph the equation.
ii) Describe the graph.

Note: When there is only one variable Solve to see what the variable equals.

a) $x = 5$

x	y
5	-2
5	0
5	2



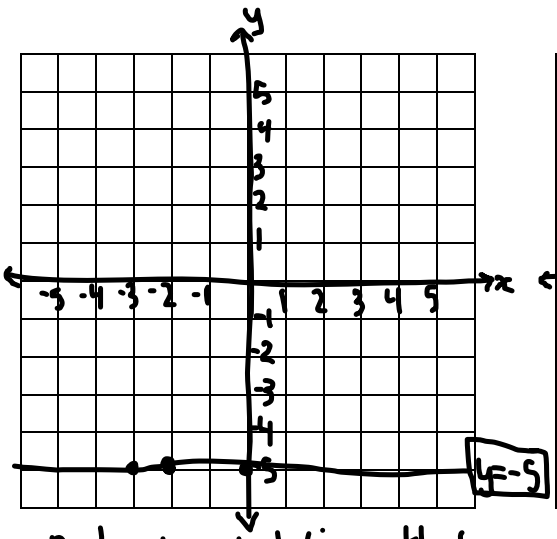
A vertical line that intersects the x-axis at 5.

b) $y + 5 = 0$

$-5 \quad -5$

$y = -5$

x	y
-2	-5
-3	-5
0	-5

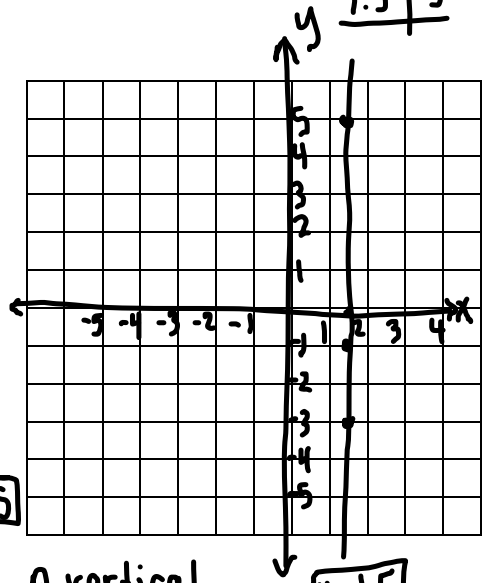


A horizontal line that intersects the y-axis at -5.

c) $\frac{3x}{3} = \frac{4.5}{3}$

$x = 1.5$

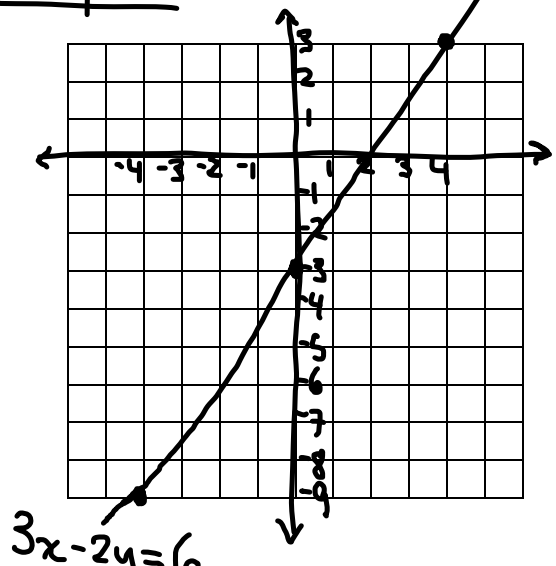
x	y
1.5	-3
1.5	-1
1.5	5



A vertical line that intersects the x-axis at 1.5

Example (3): For the equation $3x - 2y = 6$ ← 2 variables (x, y) produces an oblique line (diagonal) line!
i) Make a table of values for x = -4, 0 and 4
ii) Graph the equation

x	y
-4	-9
0	-3
4	3



$x = -4$

$3x - 2y = 6$

$3(-4) - 2y = 6$

$-12 - 2y = 6$

$+12 \quad +12$

$\frac{-2y}{-2} = \frac{18}{-2}$

$y = -9$

$x = 0$

$3x - 2y = 6$

$3(0) - 2y = 6$

$0 \cdot 2y = 6$

$\frac{-2y}{-2} = \frac{6}{-2}$

$y = -3$

$x = 4$

$3x - 2y = 6$

$3(4) - 2y = 6$

$12 - 2y = 6$

$-12 \quad -12$

$\frac{-2y}{-2} = \frac{-6}{-2}$

$y = 3$