Lesson 5-1

Objective - To graph linear equations using x-y charts.

One Variable Equations

$2x - 3 = 11$
$+3 \quad +3$
$\frac{2x}{2} = \frac{14}{2}$
$x = 7$

One Solution

$x^2 = 16$
$x = 4 \text{ or } x = -4$

Two Solutions

Two Variable Equations

$x + y = 5$

Solutions:	Ordered Pairs (x,y)
x = 1, y = 4	(1,4)
x = 2, y = 3	(2,3)
x = 4, y = 1	(4,1)
x = 5, y = 0	(5,0)
x = 7, y = -2	(7,-2)
$x = \frac{1}{2}, y = 4\frac{1}{2}$	$\left(\frac{1}{2}, 4\frac{1}{2}\right)$

x	y
1	4
2	3
4	1
5	0
7	-2
$\frac{1}{2}$	$4\frac{1}{2}$

Infinite Solutions

Determine whether the ordered pair is a solution to the given equation.

1) $x + y = -5$; $(8,3)$

$8 + 3 \stackrel{?}{=} -5$
$8 + 3 \neq -5$
Not a solution

2) $x = 8 - y$; $(12,-4)$

$12 \stackrel{?}{=} 8 - -4$
$12 = 8 + +4$
It is a solution

3) $y = 13 + x$; $(-7,6)$

$6 \stackrel{?}{=} 13 + -7$
$6 = 13 - 7$
It is a solution

4) $y - 3 = x + 1$; $(5,1)$

$1 - 3 \stackrel{?}{=} 5 + 1$
$-2 \neq 6$
Not a solution

Solve the following equations for y. (Function Form)

1) $2x + y = 5$
$-2x \quad -2x$
$y = -2x + 5$

2) $-x + 2y = -4$
$+x \quad +x$
$\frac{2y}{2} = \frac{x - 4}{2}$
$y = \frac{x - 4}{2}$
$y = \frac{x}{2} + \frac{-4}{2}$
$y = \frac{1}{2}x - 2$

Solve the following equations for y. (Function Form)

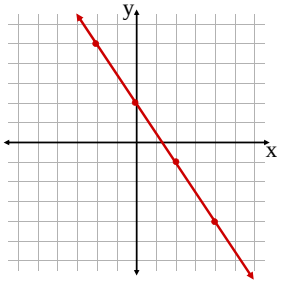
3) $3x + 5y = 10$
$-3x \quad -3x$
$\frac{5y}{5} = \frac{-3x + 10}{5}$
$y = \frac{-3x + 10}{5}$
$y = \frac{-3x}{5} + \frac{10}{5}$
$y = -\frac{3}{5}x + 2$

4) $-2x + 3y = -6$
$+2x \quad +2x$
$\frac{3y}{3} = \frac{2x - 6}{3}$
$y = \frac{2x - 6}{3}$
$y = \frac{2x}{3} + \frac{-6}{3}$
$y = \frac{2}{3}x - 2$

Solve the equation for y, complete the chart, and graph.

1) $3x + 2y = 4$
$-3x \quad -3x$
$\frac{2y}{2} = \frac{-3x + 4}{2}$
$y = \frac{-3x + 4}{2}$
$y = \frac{-3x}{2} + \frac{4}{2}$
$y = -\frac{3}{2}x + 2$

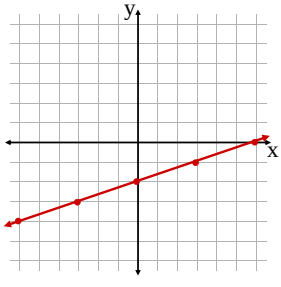
x	y
-4	8
-2	5
0	2
2	-1
4	-4
6	-7



Solve the equation for y, complete the chart, and graph.

2) $x - 3y = 6$
$-x \quad -x$
$\frac{-3y}{-3} = \frac{-x + 6}{-3}$
$y = \frac{-x + 6}{-3}$
$y = \frac{-x}{-3} + \frac{6}{-3}$
$y = \frac{1}{3}x - 2$

x	y
-6	-4
-3	-3
0	-2
3	-1
6	0
9	1



Lesson 5-1 (cont.)

Linear Equations	Non-linear Equations
$y = 3x$	$y = 3x^2$
$y = \frac{x}{2} - 1$	$y = x^4 + 3$
$y = 6x + 5$	$y = \sqrt{x}$
$C = \pi \bullet d$	$A = \pi \bullet r^2$
$P = 4s$	$A = s^2$
$x + y = 7$	$x \bullet y = 7$

Types of Lines

	Oblique	Horizontal	Vertical
Equation form	Ax + By = C	y = k	x = k
Example	3x - 2y = 5	y = -7	$x = \frac{3}{4}$
Universal constants	A = 3 B = -2 C = 5	k = -7	$k = \frac{3}{4}$

A, B and C are integers (no fractions or decimals).
k represents a rational number.

Standard Form

Convert the following equation to standard form.

$y = \frac{3}{4}x - 2$

$-\frac{3}{4}x \quad -\frac{3}{4}x$

$4\left(-\frac{3}{4}x + y = -2\right)$

$-3x + 4y = -8$

or

$3x - 4y = 8$

Standard Form
$Ax + By = C$

A, B, and C must be integers.

Standard Form

Convert the following equation to standard form.

$y = -\frac{2}{3}x + 5$

$+\frac{2}{3}x \quad +\frac{2}{3}x$

$3\left(\frac{2}{3}x + y = 5\right)$

$2x + 3y = 15$

or

$-2x - 3y = -15$

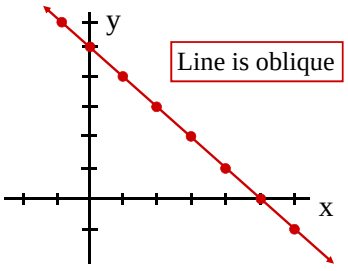
Standard Form
$Ax + By = C$

A, B, and C must be integers.

Graphing Horizontal and Vertical Lines

Graph x + y = 5

x	y
-2	7
-1	6
0	5
1	4
2	3
3	2
4	1
5	0
6	-1

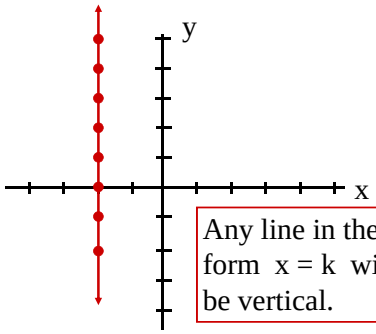


Line is oblique

Graph.
x = -2

Line is Vertical

x	y
-2	-2
-2	-1
-2	0
-2	1
-2	2
-2	3
-2	4
-2	5



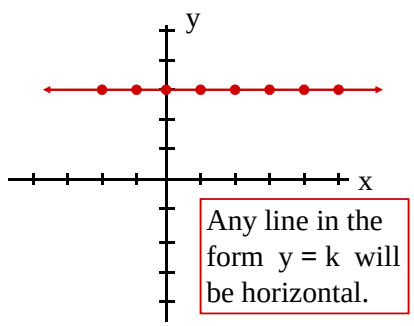
Any line in the form x = k will be vertical.

Lesson 5-1 (cont.)

Graph.
y = 3

Line is Horizontal

x	y
-2	3
-1	3
0	3
1	3
2	3
3	3
4	3
5	3



Any line in the form y = k will be horizontal.

Review

Horizontal Line

y = k

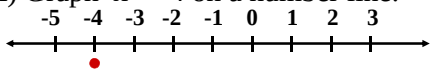
Perpendicular to y-axis.

Vertical Line

x = k

Perpendicular to x-axis.

A) Graph x = -4 on a number line.



B) Graph x = -4 on a coordinate plane.