8.2 Linear Equations in Two Variables

Goal: Find solutions of equations in two variables.

Vocabulary

Equation in two variables:	
Solution of an equation in two variables:	
Graph of an equation in two variables:	
Linear equation:	an equation that, when graphed, forms a ex: $y = \frac{1}{4}x + 4$
Function form:	

linear equation

Example 1 *Checking Solutions*

Tell whether $(5, -1)$ is a solution of $x - 3y = 8$.

Solution (x, y)

$x - 3y = 8$ Write original equation.

$5 - 3(-1) \stackrel{?}{=} 8$ Substitute for x and for y.

$5 + 3 = 8$ Simplify.

$8 = 8$ ✓

Answer: $(5, -1)$ is a solution of $x - 3y = 8$.

Checkpoint Tell whether the ordered pair is a solution of $2x - y = 5$.

1. $(0, -5)$

2. $(3, 2)$ — (x, y)

$2x - y = 5$

$2(3) - 2 = 5$

$6 - 2 = 5$

$4 \neq 5$ NO

3. $(-2, -9)$

$2x - y = 5$

$2(-2) - (-9) = 5$

$-4 + 9 = 5$

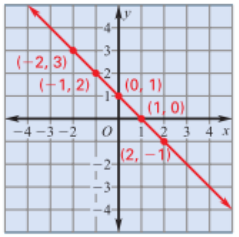
$5 = 5$ ✓ yes

Example 2 *Graphing a Linear Equation*

Graph $y = -x + 1$.

1. Make a table of solutions.

x	-2	-1	0	1	2
y					



2. List the solutions as ordered pairs.

$(-2, 3), (-1, 2), (0, 1), (1, 0), (2, -1)$

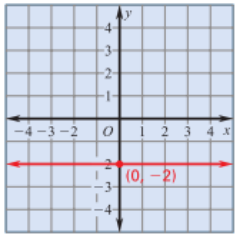
3. Graph the ordered pairs, and note that the points lie on a ____. Draw the ____, which is the graph of $y = -x + 1$.

x	$-x + 1$	y
-2	$2 + 1$	3
-1	$1 + 1$	2
0	$0 + 1$	1
1	$-1 + 1$	0
2	$-2 + 1$	-1

Example 3 *Graphing Horizontal and Vertical Lines*

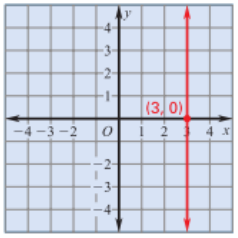
Graph $y = -2$ and $x = 3$.

a. The graph of the equation $y = -2$ is ____.



$y = \#$ horizontal line @ that #

b. The graph of the equation $x = 3$ is ____.



$x = \#$ vertical line @ that #

x	3x − 2	y
−1	3(−1) − 2 −3 − 2	−5
0	3(0) − 2 0 − 2	−2
1	3(1) − 2 3 − 2	1
2	3(2) − 2 6 − 2	4

Example 4 *Writing an Equation in Function Form*

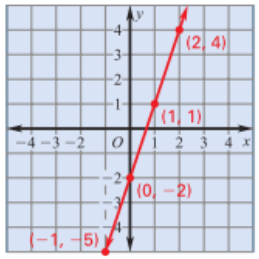
Write $3x - y = 2$ in function form. Then graph the equation.

To write the equation in function form, solve for y.

$3x - y = 2$	Write original equation.
$-y = -3x + 2$	Subtract $3x$ from each side.
$y = 3x - 2$	Multiply each side by -1.

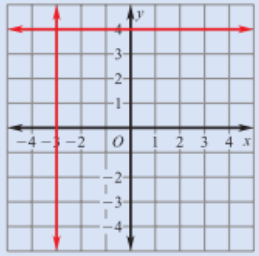
To graph the equation, use its function form to make a table of solutions. Graph the ordered pairs (x, y) from the table, and draw a line through the points.

x	−1	0	1	2
y	−5	−2	1	4



Checkpoint

4. Graph $y = 4$ and $x = -3$. Tell whether each equation is a function.



5. Write $x - 2y = 4$ in function form. Then graph the equation.