4-4 Study Guide and Intervention
Equations as Relations

Solve Equations The equation $y = 3x - 4$ is an example of an **equation in two variables** because it contains two variables, x and y. The **solution** of an equation in two variables is an ordered pair of replacements for the variables that results in a true statement when substituted into the equation.

Example 1 Find the solution set for $y = -2x - 1$, given the replacement set $\{(-2, 3), (0, -1), (1, -2), (3, 1)\}$.

Make a table. Substitute the x and y-values of each ordered pair into the equation.

x	y	y = −2x − 1	True or False
−2	3	$3 = -2(-2) - 1$ $3 = 3$	True
0	−1	$-1 = -2(0) - 1$ $-1 = -1$	True
1	−2	$-2 = -2(1) - 1$ $-2 = -3$	False
3	1	$1 = -2(3) - 1$ $1 = -7$	False

The ordered pairs $(-2, 3)$, and $(0, -1)$ result in true statements. The solution set is $\{(-2, 3), (0, -1)\}$.

Example 2 Solve $b = 2a - 1$ if the domain is $\{-2, -1, 0, 2, 4\}$.

Make a table. The values of a come from the domain. Substitute each value of a into the equation to determine the corresponding values of b in the range.

a	2a − 1	b	(a, b)
−2	$2(-2) - 1$	−5	(−2, −5)
−1	$2(-1) - 1$	−3	(−1, −3)
0	$2(0) - 1$	−1	(0, −1)
2	$2(2) - 1$	3	(2, 3)
4	$2(4) - 1$	7	(4, 7)

The solution set is $\{(-2, -5), (-1, -3), (0, -1), (2, 3), (4, 7)\}$.

Exercises

Find the solution set of each equation, given the replacement set.

1. $y = 3x + 1$; $\{(0, 1), \left(\frac{1}{3}, 2\right), \left(-1, -\frac{2}{3}\right), (-1, -2)\}$

2. $3x - 2y = 6$; $\{(-2, 3), (0, 1), (0, -3), (2, 0)\}$

3. $2x = 5 - y$; $\{(1, 3), (2, 1), (3, 2), (4, 3)\}$

Solve each equation if the domain is $(-4, -2, 0, 2, 4\}$.

4. $x + y = 4$

5. $y = -4x - 6$

6. $5a - 2b = 10$

7. $3x - 2y = 12$

8. $6x + 3y = 18$

9. $4x + 8 = 2y$

10. $x - y = 8$

11. $2x + y = 10$

<div style="writing-mode: vertical">Lesson 4-4</div>