LESSON 6.1

Equations in Two Variables

CA Standards AF 4.2

Goal: Find solutions of equations of two variables.

Vocabulary

Solution of an equation in two variables: An ordered pair whose coordinates make an equation true

EXAMPLE 1 Checking Solutions

Tell whether (5, −8) is a solution of $4x - y = 12$.

$4x - y = 12$ Write original equation.

$4(\boxed{5}) - \boxed{(-8)} \stackrel{?}{=} 12$ Substitute 5 for x and −8 for y.

$\boxed{20 + 8} \stackrel{?}{=} 12$ Simplify.

$\boxed{28} \neq 12$ Add. Solution does not check.

Answer: The ordered pair (5, −8) is not a solution of $4x - y = 12$.

When you substitute 5 for x and −8 for y, the result is not a true equation.

EXAMPLE 2 Multiple Choice Practice

Bowling At a bowling alley, it costs \$5 to rent shoes plus \$3 per game. The total cost can be modeled by the equation $C = 5 + 3g$, where C is the total cost, in dollars, and g is the number of games bowled. Which table shows some possible total costs for bowling?

(A)

g	1	2	3	4
C	\$3	\$6	\$9	\$12

(B)

g	1	2	3	4
C	\$8	\$11	\$14	\$17

(C)

g	1	2	3	4
C	\$3	\$8	\$13	\$18

(D)

g	1	2	3	4
C	\$8	\$16	\$24	\$32

Solution

Substitute several values of g into the equation and solve for C. Then identify the table that contains the solutions.

g-value	Substitute for g.	Evaluate	Solution (g, C)
$g = 1$	$C = 5 + 3($ 1 $)$	$C =$ 8	(1, 8)
$g = 2$	$C = 5 + 3($ 2 $)$	$C =$ 11	(2, 11)
$g = 3$	$C = 5 + 3($ 3 $)$	$C =$ 14	(3, 14)
$g = 4$	$C = 5 + 3($ 4 $)$	$C =$ 17	(4, 17)

Answer: The correct answer is B. (A) (B) (C) (D)

Guided Practice **Tell whether the ordered pair is a solution of the equation.**

1. $y = -3x - 5$; $(-4, 7)$

2. $-7y + x = -7$; $(-1, -14)$

EXAMPLE 3 Finding Solutions of an Equation

Solve the equation $6x + 2y = 16$ for y. Then list four solutions.

1. Solve the equation for y.

$6x + 2y = 16$ Write original equation.

$2y = 16 - 6x$ Subtract $6x$ from each side.

$y = 8 - 3x$ Divide each side by 2.

When dividing each side by 2, make sure you divide each term of the expression by 2.

2. Substitute several values of x into the equation and solve for y.

***x*-value**	**Substitute for *x*.**	**Evaluate**	**Solution (x, y)**
$x = -1$	$y = 8 - 3(-1)$	$y = 11$	$(-1, 11)$
$x = 0$	$y = 8 - 3(0)$	$y = 8$	$(0, 8)$
$x = 1$	$y = 8 - 3(1)$	$y = 5$	$(1, 5)$
$x = 2$	$y = 8 - 3(2)$	$y = 2$	$(2, 2)$

Answer: Four solutions are $(-1, 11)$, $(0, 8)$, $(1, 5)$, and $(2, 2)$.

Generally, an equation involving two variables has an infinite number of solutions.

Guided Practice **List four solutions of the equation.**

3. $y = -5x + 11$

4. $18x - 3y = 9$

Homework