NAME _____ DATE _____ PERIOD _____

7-3 Elimination Using Addition and Subtraction *(Pages 382–386)*

In systems of equations where the coefficients of terms containing the same variable are *opposites*, the **elimination** method can be applied by adding the equations. If the coefficients of those terms are the *same*, the elimination method can be applied by subtracting the equations.

Examples **Solve each system of equations using elimination.**

a. $x - 2y = 13$ **and** $3x + 2y = 15$

Add the two equations, since the coefficients of the y-terms, −2 and 2, are opposites.

$x - 2y = 13$
$(+)\ 3x + 2y = 15$
$4x = 28$ *Solve for x.*
$x = 7$ *Divide each side by 4.*

$x - 2y = 13$ *Use the first equation.*
$7 - 2y = 13$ *Substitute 7 for x.*
$-2y = 6 \Rightarrow y = -3$

The solution of the system is (7, −3).

b. $3x + 4y = 5$ **and** $3x - y = -5$

Subtract the two equations, since the coefficients of the x-terms are the same.

$3x + 4y = 5$
$(-)\ 3x - y = -5$
$5y = 10$ *Solve for y.*
$y = 2$ *Divide each side by 5.*

$3x - y = -5$ *Use the second equation.*
$3x - 2 = -5$ *Substitute 2 for y.*
$3x = -3 \Rightarrow x = -1$

The solution of the system is (−1, 2).

Try These Together

State whether addition, subtraction, or substitution would be most convenient to solve each system of equations. Then solve the system.

1. $x - y = 3$
$3x + y = 1$

2. $3x + 4y = 2$
$2x + 4y = 8$

3. $2x + 4y = 8$
$y - 3 = x$

Practice

State whether addition, subtraction, or substitution would be most convenient to solve each system of equations. Then solve the system.

4. $x + 2y = 3$
$-x + y = 6$

5. $x + y = -2$
$x - y = 8$

6. $2y - 3x = 12$
$-2y + 6x = -5$

7. $2x + y = -5$
$x + 3y = 25$

8. $x - 4y = 16$
$2x - 4y = 18$

9. $2x + 4y = 6$
$3x - 4y = 2$

10. $8x + y = 1$
$-8x - 4y = 3$

11. $2x - 5y = -6$
$2x + 3y = -9$