Name _____ Date _____ Class _____

LESSON 3-2

Practice B

Using Algebraic Methods to Solve Linear Systems

Use substitution to solve each system of equations.

1. $\begin{cases} x = 7y - 4 \\ 2x - 3y = 14 \end{cases}$

2. $\begin{cases} y - 3x = 5 \\ 2x = 3y + 6 \end{cases}$

3. $\begin{cases} 3x - 4y = 20 \\ y - 2x = 0 \end{cases}$

Use elimination to solve each system of equations.

4. $\begin{cases} x + 6y = 1 \\ 3x + 5y = -10 \end{cases}$

5. $\begin{cases} 3x + 4y = 6 \\ 2x + 3y = 3 \end{cases}$

6. $\begin{cases} 3x - 5y = 1 \\ 2x + 3y = -12 \end{cases}$

Use substitution or elimination to solve each system of equations.

7. $\begin{cases} x + y = 13 \\ 2x - 3y = 1 \end{cases}$

8. $\begin{cases} 9x + 2y = 5 \\ 3x - y = -10 \end{cases}$

9. $\begin{cases} 2x + y = 1 \\ x = 5 + y \end{cases}$

10. $\begin{cases} x = -8y \\ x + y = 14 \end{cases}$

11. $\begin{cases} 2x + 4y = 12 \\ -3x + 3y = 63 \end{cases}$

12. $\begin{cases} 5x - 2y = -1 \\ 3x - y = -2 \end{cases}$

Solve.

13. Bill leaves his house for Makayla's house riding his bicycle at 8 miles per hour. At the same time, Makayla leaves her house heading toward Bill's house walking at 3 miles per hour.

a. Write a system of equations to represent the distance, *d,* each is from Makayla's house in *h* hours. They live 8.25 miles apart.

b. Solve the system to determine how long they travel before meeting.

LESSON 3-2

Practice A

Using Algebraic Methods to Solve Linear Systems

Use substitution to solve each system of equations.

1. $\begin{cases} y = x - 3 \\ x + 2y = 6 \end{cases}$

a. Substitute $x - 3$ for y in $x + 2y = 6$. Then solve the equation for x.

$x = 4$

b. Substitute your value for x in $y = x - 3$ and solve for y.

$y = 1$

c. Write the solution as an ordered pair. $(4, 1)$

2. $\begin{cases} x = 5 - y \\ 2x + 5y = 16 \end{cases}$ $(3, 2)$

3. $\begin{cases} y = 3x + 2 \\ 2x + 3y = 17 \end{cases}$ $(1, 5)$

4. $\begin{cases} x - y = 2 \\ y = 4x + 1 \end{cases}$ $(-1, -3)$

Use elimination to solve each system of equations.

5. $\begin{cases} 4x - 5y = 7 \\ 3x - 4y = 6 \end{cases}$

a. Multiply the first equation by -3 and the second equation by 4.

$\begin{cases} -12x + 15y = -21 \\ 12x - 16y = 24 \end{cases}$

b. Add the two equations, which eliminates x. Solve for y.

$y = -3$

c. Substitute your value for y into the first equation. Solve for x.

Write the solution as an ordered pair. $(-2, -3)$

6. $\begin{cases} 5x + y = 19 \\ -2x - y = -7 \end{cases}$ $(4, -1)$

7. $\begin{cases} -x + 3y = 12 \\ 6x - y = -21 \end{cases}$ $(-3, 3)$

8. $\begin{cases} 2x + 3y = 4 \\ 4x - 2y = -8 \end{cases}$ $(-1, 2)$

LESSON 3-2

Practice B

Using Algebraic Methods to Solve Linear Systems

Use substitution to solve each system of equations.

1. $\begin{cases} x = 7y - 4 \\ 2x - 3y = 14 \end{cases}$ $(10, 2)$

2. $\begin{cases} y - 3x = 5 \\ 2x = 3y + 6 \end{cases}$ $(-3, -4)$

3. $\begin{cases} 3x - 4y = 20 \\ y - 2x = 0 \end{cases}$ $(-4, -8)$

Use elimination to solve each system of equations.

4. $\begin{cases} x + 6y = 1 \\ 3x + 5y = -10 \end{cases}$ $(-5, 1)$

5. $\begin{cases} 3x + 4y = 6 \\ 2x + 3y = 3 \end{cases}$ $(6, -3)$

6. $\begin{cases} 3x - 5y = 1 \\ 2x + 3y = -12 \end{cases}$ $(-3, -2)$

Use substitution or elimination to solve each system of equations.

7. $\begin{cases} x + y = 13 \\ 2x - 3y = 1 \end{cases}$ $(8, 5)$

8. $\begin{cases} 9x + 2y = 5 \\ 3x - y = -10 \end{cases}$ $(-1, 7)$

9. $\begin{cases} 2x + y = 1 \\ x = 5 + y \end{cases}$ $(2, -3)$

10. $\begin{cases} x = -8y \\ x + y = 14 \end{cases}$ $(16, -2)$

11. $\begin{cases} 2x + 4y = 12 \\ -3x + 3y = 63 \end{cases}$ $(-12, 9)$

12. $\begin{cases} 5x - 2y = -1 \\ 3x - y = -2 \end{cases}$ $(-3, -7)$

Solve.

13. Bill leaves his house for Makayla's house riding his bicycle at 8 miles per hour. At the same time, Makayla leaves her house heading toward Bill's house walking at 3 miles per hour.

a. Write a system of equations to represent the distance, d, each is from Makayla's house in h hours. They live 8.25 miles apart.

$\begin{cases} d = 8.25 - 8h \\ d = 3h \end{cases}$

b. Solve the system to determine how long they travel before meeting.

0.75 h or 45 min

LESSON 3-2

Practice C

Using Algebraic Methods to Solve Linear Systems

Use substitution or elimination to solve each system of equations.

1. $\begin{cases} x = y - 5.2 \\ 2x + 3y = 9.6 \end{cases}$ $(-1.2, 4)$

2. $\begin{cases} 3x - 4y = 5 \\ x = y + \frac{1}{2} \end{cases}$ $\left(-3, -3\frac{1}{2}\right)$

3. $\begin{cases} x + 4y = \frac{1}{4} \\ 4x - 3y = 39 \end{cases}$ $\left(8\frac{1}{4}, -2\right)$

4. $\begin{cases} 2x + 20y = 3 \\ 2x = -7y - 10 \end{cases}$ $\left(-8\frac{1}{2}, 1\right)$

5. $\begin{cases} x + y = 5 \\ 3x + 2y = 4 \end{cases}$ $(-6, 11)$

6. $\begin{cases} 3x + 4y = 35 \\ 4x - 2y = 21 \end{cases}$ $\left(7, 3\frac{1}{2}\right)$

7. $\begin{cases} 3\frac{1}{4}x + 3y = 42 \\ 5x = 4y \end{cases}$ $\left(6, 7\frac{1}{2}\right)$

8. $\begin{cases} 5x - 5y = 6 \\ 4x + 7y = -4 \end{cases}$ $\left(\frac{2}{5}, -\frac{4}{5}\right)$

9. $\begin{cases} 2x - 8y = 24 \\ x - 21 = 16y \end{cases}$ $\left(9, -\frac{3}{4}\right)$

Solve.

10. Cora bought 4 pounds of nuts and 2 pounds of raisins for $23.50. Mark bought 2 pounds of nuts and 4 pounds of raisins for $18.50.

a. Write a system of equations that represents the price of the nuts, n, and the price of the raisins, r. $\begin{cases} 4n + 2r = 23.5 \\ 2n + 4r = 18.5 \end{cases}$

b. Solve the system. How much should a pound of nuts and a pound of raisins cost together? $7.00

11. Kate and Riley are reading the same book. Kate reads $\frac{1}{3}$ page per minute, and Riley reads $\frac{3}{4}$ page per minute. Kate has already read 70 pages, while Riley has read 30 pages. If they both resume reading together, eventually Riley will catch up to Kate.

a. On what page will that occur?

102

b. How many minutes have they read when Riley catches up?

96

LESSON 3-2

Reteach

Using Algebraic Methods to Solve Linear Systems

To use the **substitution method** to solve a system of linear equations:

1. Solve one equation for one variable.
2. Substitute this expression into the other equation.
3. Solve for the other variable.
4. Substitute the value of the known variable in the equation in Step 1.
5. Solve for the other variable.
6. Check the values in both equations.

Use this equation. It is solved for y.

$\begin{cases} y = x + 2 \\ 2x + y = 17 \end{cases}$

Use the substitution method when the coefficient of one of the variables is 1 or -1.

$2x + y = 17$

$2x + (x + 2) = 17$ *Substitute $x + 2$ for y.*

$3x + 2 = 17$ *Simplify and solve for x.*

$3x = 15$

$x = 5$

Substitute $x = 5$ into $y = x + 2$ and solve for y. $y = x + 2$

$y = 5 + 2$

$y = 7$

The solution of the system is the ordered pair $(5, 7)$.

Check using both equations: $y = x + 2$; $7 \stackrel{?}{=} (5) + 2$; $7 = 7$✓

$2x + y = 17$; $2(5) + 7 \stackrel{?}{=} 17$; $17 = 17$✓

Use substitution to solve each system of equations.

1. $\begin{cases} y = 2x - 5 \\ 3x + y = 10 \end{cases}$

Use $y = 2x - 5$.

$3x +$ $2x - 5$ $= 10$

$5x - 5 = 10$

$x = 3$

$y = 2(3) - 5 = 1$

Ordered pair solution: $(3, 1)$

2. $\begin{cases} 3x + 2y = 1 \\ x - y = 2 \end{cases}$

Solve for x: $x - y = 2$.

$x =$ $y + 2$

$3($ $y + 2$ $) + 2y = 1$

$y = -1$

$x = -1 + 2 = 1$

Ordered pair solution: $(1, -1)$