

Name _____



4-3 Homework Practice

Solving Systems of Equations by Elimination

Use elimination to solve each system of equations.

$$\begin{aligned} 1. & \begin{cases} x + y = 7 & A \\ x - y = -3 & B \end{cases} \\ & \hline & 2x = 4 \\ & \frac{2x}{2} = \frac{4}{2} \\ & x = 2 \end{aligned}$$

Step 2: Add equations together to eliminate a variable

Step 3: Solve for remaining variable

$$\begin{aligned} (A) & \begin{cases} x + y = 7 \\ (2) + y = 7 \\ -2 \quad -2 \\ \hline y = 5 \end{cases} \end{aligned}$$

$(2, 5)$

Step 4: Plug in to one of the original equations to solve for other variable

Step 5: Write Coordinate as (x,y)

$$3. \begin{cases} 5x + 3y = 12 & A \\ x - 4y = 7 & B \end{cases}$$

Step 1: Multiply one or both equations by a number in order to add and cancel a variable

$$\begin{aligned} (B) & -5x + 20y = -35 \\ (A) & + 5x + 3y = 12 \\ & \hline & 23y = -23 \\ & \frac{23y}{23} = \frac{-23}{23} \\ & y = -1 \end{aligned}$$

$$\begin{aligned} (B) & x - 4(-1) = 7 \\ & x + 4 = 7 \\ & -4 \quad -4 \\ & \hline & x = 3 \end{aligned}$$

$(3, -1)$

$$\begin{aligned} 2. & \begin{cases} -3x + 6y = -30 & A \\ 3x + y = -12 & B \end{cases} \\ & \hline & 7y = -42 \\ & \frac{7y}{7} = \frac{-42}{7} \\ & y = -6 \end{aligned}$$

$(-2, -6)$

$$\begin{aligned} (B) & 3x + (-6) = -12 \\ & \quad +6 \quad +6 \\ & \hline & 3x = -6 \\ & \frac{3x}{3} = \frac{-6}{3} \\ & x = -2 \end{aligned}$$

$$\begin{aligned} 4. & \begin{cases} 6x + 2y = -12 & A \\ 4x + 3y = 7 & B \end{cases} \\ (A) & 18x + 6y = -36 \\ + & -8x - 6y = -14 \\ \hline & 10x = -50 \\ & x = -5 \end{aligned}$$

Determine which solution method, graphing, substitution, or elimination, is the most appropriate for solving each system of equations? Explain, DO NOT SOLVE.

7. $\begin{cases} 3x + 8y = -4 \\ 2x - 4y = 16 \end{cases}$

8. $\begin{cases} 6x - y = 16 \\ x = 4y - 5 \end{cases}$

9. $\begin{cases} x + y = 19 \\ 3x - 2y = -3 \end{cases}$

Name _____



4-3 Homework Practice

Solving Systems of Equations by Elimination

Use elimination to solve each system of equations.

1. $\begin{cases} x + y = 7 & \text{A} \\ x - y = -3 & \text{B} \end{cases}$

$$\begin{array}{r} x + y = 7 \\ x - y = -3 \\ \hline 2x = 4 \\ \hline x = 2 \end{array}$$

Ⓐ $\begin{cases} (2) + y = 7 \\ -2 \quad -2 \end{cases}$

$$\begin{array}{r} (2) + y = 7 \\ -2 \quad -2 \\ \hline y = 5 \end{array}$$

Step 2: Add equations together to eliminate a variable

Step 3: Solve for remaining variable

Step 4: Plug in to one of the original equations to solve for other variable

Step 5: Write Coordinate as (x,y)

$(2, 5)$

2. $\begin{cases} -3x + 6y = -30 \\ 3x + y = -12 \end{cases}$

$$\begin{array}{r} -3x + 6y = -30 \\ 3x + y = -12 \\ \hline 7y = -42 \\ y = -6 \end{array}$$

$3x + (-6) = -12$

$$\begin{array}{r} 3x + (-6) = -12 \\ +6 \quad +6 \\ \hline 3x = -6 \\ \frac{3x}{3} = \frac{-6}{3} \\ x = -2 \end{array}$$

$(-2, -6)$

3. $\begin{cases} 5x + 3y = 12 & \text{A} \\ x - 4y = 7 & \text{B} \end{cases}$

Ⓑ $-5x + 20y = -35$

Ⓐ $\begin{cases} -5x + 20y = -35 \\ 5x + 3y = 12 \end{cases}$

$$\begin{array}{r} -5x + 20y = -35 \\ 5x + 3y = 12 \\ \hline 23y = -23 \\ \frac{23y}{23} = \frac{-23}{23} \\ y = -1 \end{array}$$

Step 1: Multiply one or both equations by a number in order to add and cancel a variable

Ⓑ $x - 4(-1) = 7$

$$\begin{array}{r} x - 4(-1) = 7 \\ x + 4 = 7 \\ -4 \quad -4 \\ \hline x = 3 \end{array}$$

$(3, -1)$

4. $\begin{cases} 6x + 2y = -12 & \text{A} \\ 4x + 3y = 7 & \text{B} \end{cases}$

Ⓐ $18x + 6y = -36$

Ⓑ $\begin{cases} 18x + 6y = -36 \\ -8x - 6y = -14 \end{cases}$

$$\begin{array}{r} 18x + 6y = -36 \\ -8x - 6y = -14 \\ \hline 10x = -50 \\ \frac{10x}{10} = \frac{-50}{10} \\ x = -5 \end{array}$$

$(-5, 9)$

Ⓐ $6(-5) + 2y = 12$

$$\begin{array}{r} 6(-5) + 2y = 12 \\ -30 + 2y = 12 \\ +30 \quad +30 \\ \hline 2y = 42 \\ \frac{2y}{2} = \frac{42}{2} \\ y = 21 \end{array}$$

Determine which solution method, graphing, substitution, or elimination, is the most appropriate for solving each system of equations? Explain, DO NOT SOLVE.

7. $\begin{cases} 3x + 8y = -4 \\ 2x - 4y = 16 \end{cases}$

8. $\begin{cases} 6x - y = 16 \\ x = 4y - 5 \end{cases}$

9. $\begin{cases} x + y = 19 \\ 3x - 2y = -3 \end{cases}$

Name _____



10. Determine whether the first system of equations is equivalent to the second system of equations. Explain.

A $\begin{cases} 3x + 5y = 1 \\ 2x - 6y = 38 \end{cases}$ C $\begin{cases} 18x + 30y = 6 \\ 10x - 30y = 190 \end{cases}$

(A) $6(3x + 5y = 1)$
 $18x + 30y = 6 = \text{(C)}$

(B) $5(2x - 6y = 38)$
 $10x - 30y = 190 = \text{(D)}$

They are equivalent because (A) + (C) are the same lines and (B) and (D) are as well, so they will intersect at the same point

11. The cost of 2 bottles of water and 4 apples is \$5.50. The cost of 3 bottles of water and 5 apples is \$7.50. Find the cost of one apple and the cost of one bottle of water.

Define Variables - x: price of one apple y: price of one water bottle

Use totals to write equations
 A $(2y + 4x = 5.50) \cdot -5$
 B $(3y + 5x = 7.50) \cdot 4$

Solve your System

(A) $2(1.25) + 4x = 5.50$
 $2.50 + 4x = 5.50$
 $\frac{4x}{4} = \frac{3}{4}$
 $x = 0.75$

$\begin{array}{r} -10y - 20x = -27.50 \\ + 12y + 20x = 30 \\ \hline 2y = 2.50 \\ \frac{2y}{2} = \frac{2.50}{2} \\ y = \$1.25 \end{array}$

One apple costs 75¢ and One bottle of water costs \$1.25