adv.

Algebra 1 6.4 ✓

Solve systems by elimination
Solve problems using elimination

solve
elimination
zero pairs
multiplication property of equality
whiteboards

$(-2, 5)$

$x + 2y = 8$

$x + y = 3$ $\xrightarrow{\cdot(-1)}$ $-x - y = -3$

$y = 5$

$x + 2 \cdot 5 = 8$

$x + 10 = 8$

$-10 \quad -10$

$x = -2$

Elimination (so far)

What is the goal?

What if they don't "match up?"

$x + 2y = 8$

$6 + y = 7$

$-6 \quad -6$

$y = 1$

$x + y = 7$

$x - y = 5$

$2x = 12$

$\frac{2x}{2} = \frac{12}{2}$

$x = 6$

$(6, 1)$

If I multiply all terms by the same amount, is it still equal?

$3 = 3$

4. $2x = 8 \cdot 4$

$8x = 32$

Goal: make zero pairs...

Example 1 Multiply One Equation to Eliminate a Variable

Use elimination to solve the system of equations.

$5x + 6y = -8$
$2x + 3y = -5$ $\xrightarrow{\cdot -2}$ $-4x + -6y = 10$

$5x + 6y = -8$

$x = 2$

$5 \cdot 2 + 6 \cdot y = -8$
$10 + 6y = -8$
$-10 \quad -10$
$6y = -18$
$\frac{6y}{6} = \frac{-18}{6}$
$y = -3$

$(2, -3)$

$2 \cdot 2 + 3 \cdot -3 = -5$
$4 + -9 = -5$:)

KeyConcept Solving by Elimination

Step 1 Multiply at least one equation by a constant to get two equations that contain opposite terms.

Step 2 Add the equations, eliminating one variable. Then solve the equation.

Step 3 Substitute the value from Step 2 into one of the equations and solve for the other variable. Write the solution as an ordered pair.

Goal: make zero pairs

Example 2 Multiply Both Equations to Eliminate a Variable

Use elimination to solve the system of equations.

$4x + 2y = 8$ $\xrightarrow{3}$ $12x + 6y = 24$

$3x + 3y = 9$ $\xrightarrow{-2}$ $-6x - 6y = -18$

$4x + 2y = 8$ $\xrightarrow{6}$ $24x + 12y = 48$

$3x + 3y = 9$ $\xrightarrow{-4}$ $-12x - 12y = -36$

$12x = 12$

$\frac{12x}{12} = \frac{12}{12}$ $x = 1$

$x = 1$ $(1, 2)$

$4 \cdot 1 + 2y = 8$

$4 + 2y = 8$

$-4 \quad -4$

$2y = 4$

$\frac{2y}{2} = \frac{4}{2}$

GuidedPractice

1A. $6x - 2y = 10$
$3x - 7y = -19$ $\xrightarrow{\cdot -2}$ $-6x + 14y = 38$

$6x - 2y = 10$

$12y = 48$

$\frac{12y}{12} = \frac{48}{12}$

$6x - 2 \cdot 4 = 10$

$6x - 8 = 10$

$+8 \quad +8$

$6x = 18$

$\frac{6x}{6} = \frac{18}{6}$ $x = 3$

$(3, 4)$

(q, r)

1B. $9r + q = 13$
$3r + 2q = -4$

GuidedPractice

2A. $5x - 3y = 6$
$2x + 5y = -10$

2B. $6a + 2b = 2$
$4a + 3b = 8$

1. $2x - y = 4$
$7x + 3y = 27$

2. $2x + 7y = 1$
$x + 5y = 2$