Algebra 1 6.4
Solve systems by elimination
Solve problems using elimination

solve
elimination
zero pairs
multiplication property of equality
whiteboards

Elimination (so far)

What is the goal?

What if they don't "match up?"

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

$3 = 3$

$\frac{1}{2} \cdot 2x = 8 \cdot \frac{1}{2}$

$x = 4$

$5 \cdot 3 = 3 \cdot 5$

$15 = 15$

Goal: make zero pairs...

Example 1 Multiply One Equation to Eliminate a Variable

Use elimination to solve the system of equations.

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

$5x + 6y = -8$

$x = 2$

$(2, -3)$

$2 \cdot 2 + 3 \cdot -3 = -5$

$4 + -9 = -5$

$5 \cdot 2 + 6y = -8$

$10 + 6y = -8$

$-10 \quad -10$

$\frac{6y}{6} = \frac{-18}{6}$

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.

$4x + 2y = 8$

$3x + 3y = 9$

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

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

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

$x = 1$

$4 \cdot 1 + 2y = 8$

$4 + 2y = 8$

$-4 \quad -4$

$2y = 4$

$y = 2$

(1, 2)

$3 \cdot 1 + 3 \cdot 2 = 9$

$3 + 6 = 9$

GuidedPractice

1A. $6x - 2y = 10$
$3x - 7y = -19$

$\xrightarrow{-1}$
$\xrightarrow{2}$

$-6x + 2y = -10$
$6x - 14y = -38$

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

$y = 4$

$6x - 2 \cdot 4 = 10$

$6x - 8 = 10$
$+8 \quad +8$

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

$x = 3$

(3, 4)

$3 \cdot 3 - 7 \cdot 4 = -19$
$9 - 28 = -19$

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

(q, r)

GuidedPractice

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

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

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

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