Algebra 1 6.4

Solve systems by elimination

Solve problems using elimination

solve

elimination

zero pairs

multiplication property of equality

whiteboards

$2 \cdot 3 - 3 \cdot 2$

$6 = 6$

$3 \cdot 2 + 3 \cdot 5 = 3 \cdot 7$

$6 + 15 = 21$

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?

$3 = 3$

$2x = 8$

Goal: make zero pairs...

Example 1 Multiply One Equation to Eliminate a Variable

Use elimination to solve the system of equations.

- $5x + 6y = -8$ → $5x + 6y = -8$
- $2x + 3y = -5$ → -2 → $-4x - 6y = 10$

$x = 2$

$(2, -3)$

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

$4 + -9 = -5$

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

$10 + 6y = -8$

$-10 \quad -10$

$6y = -18$

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

$y = -3$

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.

(n, 8)

Goal: make zero pairs

LCM

Example 2 Multiply Both Equations to Eliminate a Variable

Use elimination to solve the system of equations.

$4x + 2y = 8$

$3x + 3y = 9$

$-12x - 6y = -24$

$12x + 12y = 36$

$6y = 12$

$\frac{6y}{6} = \frac{12}{6}$

$y = 2$

(1, 2)

$4x + 2 \cdot 2 = 8$

$4x + 4 = 8$

$-4 \quad -4$

$4x = 4$

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

$3 + 6 = 9$

Practice

$-2y = 10$

$-7y = -19$

$\rightarrow \quad 6x - 2y = 10$

$\xrightarrow{-3} \quad -6x + 14y = 38$

$12y = 48$

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

$y = 4$

$6 \cdot x - 2 \cdot 4 = 10$

$6x - 8 = 10$

$+8 \quad +8$

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

$x = 3$

$(3, 4)$

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

$\times -2 \rightarrow -18r - 2q = -26$
$3r + 2q = -4$

$-15r = -30$

$\frac{-15r}{-15} = \frac{-30}{-15}$

$r = 2$

$9 \cdot 2 + q = 13$
$18 + q = 13$
$-18 \quad -18$
$q = -5$

$(-5, 2)$

GuidedPractice

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

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

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

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