Algebra 1 6.3

Solve systems of equations by elimination ← zero pairs

system of equations

solve (x,y) *Where do the two lines intersect?*

substitution method
zero pair
additive inverse
addition property of equality
whiteboards

Quiz 6.1-6.2

$$\begin{array}{r} 5 = 5 \\ +3 \quad +3 \\ \hline 8 = 8 \end{array}$$

addition property
So if they are equal, is it OK to add the same thing to both sides?

$$\begin{array}{r} x + 6 = 8 \\ -6 \quad -6 \\ \hline x = 14 \end{array}$$

5 = 5
x - 6 = 8
3x - 6y = 3

Make zero pairs

## Example 1 Elimination Using Addition

**Use elimination to solve the system of equations.**

$$4x + 6y = 32$$
$$3x - 6y = 3$$

$4 \cdot 5 + 6y = 32$
$20 + 6y = 32$
$-20 \quad -20$

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

$y = 2$

$\frac{7x}{7} = \frac{35}{7}$

$x = 5$

$(5, 2)$

Are they equal?
So...OK to add same thing to both sides...

**GuidedPractice**

**1A.** $-4x + 3y = -3$

$4x - 5y = 5$

$(0, -1)$

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

$y = -1$

$4x - 5(-1) = 5$

$4x + 5 = 5$

$-5 \quad -5$

$\frac{4x}{4} = \frac{0}{4}$

**1B.** $4y + 3x = 22$ ←
$3x - 4y = 14$

How can I make a zero pair?

$(6, 1)$

$\frac{6x}{6} = \frac{36}{6}$

$x = 6$

$4y + 3 \cdot 6 = 22$

$4y + 18 = 22$

$-18 \quad -18$

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

Define your variables: x = first number  y= second number

## Example 2 Write and Solve a System of Equations

**Negative three times one number plus five times another number is −11. Three times the first number plus seven times the other number is −1. Find the numbers.**

Multiplication property of equality
$5 = 5$

How can I make a zero pair?

## GuidedPractice

**3.** Solve the system of equations.

$$8b + 3c = 11$$
$$8b + 7c = 7$$

(b, c)

$(\frac{7}{4}, -1)$

$8b + 3 \cdot -1 = 11$

$8b + -3 = 11$

$+3 \quad +3$

$8b = 14$

$\frac{8b}{8} = \frac{14}{8}$

ordered pairs (b, c)

rearrange first

**Standardized Test Example 3**

Solve the system of equations.

$$2t + 5r = 6$$
$$9r + 2t = 22$$

$2t + 5 \cdot 4 = 6$

$2t + 20 = 6$

$-20 \quad -20$

$\frac{2t}{2} = \frac{-14}{2}$

$t = -7$

$(r, t)$

$(4, -7)$

$-1(5r + 2t = 6)$

$-5r + -2t = -6$

$9r + 2t = 22$

$r = 4$

$\frac{4r}{4} = \frac{16}{4}$

**1.** $5m - p = 7$
$7m - p = 11$

Goal: make zero pair

**2.** $8x + 5y = 38$
$-8x + 2y = 4$