Algebra 1 6.2

Solve systems of equations using substitution method

Solve problems using substitution of equations

(x , y)

solve

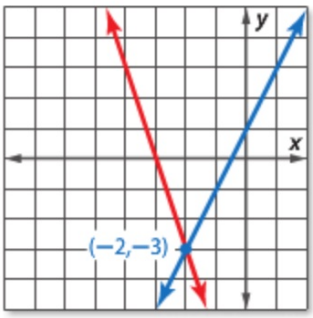
solve by graphing

substitution

substitution method

activity: cut & paste

whiteboards



Example 1 Solve a System by Substitution

Use substitution to solve the system of equations.

$y = 2x + 1$
$3x + y = -9$

Step 1 The first equation is already solved for y.

$(-2, -3)$

You are the coach... Who is on the sub list?

$y = 2x + 1$

$3x + (2x + 1) = -9$

$5x + 1 = -9$
$-1 \quad -1$

$\frac{5x}{5} = \frac{-10}{5}$ $x = -2$

$y = 2 \cdot -2 + 1$

$y = -4 + 1$

$y = -3$

$3x + y = -9$

$3 \cdot -2 + y = -9$

$-6 + y = -9$
$+6 \quad +6$

$y = -3$

KeyConcept Solving by Substitution

Step 1 When necessary, solve at least one equation for one variable. x = y =

Step 2 Substitute the resulting expression from Step 1 into the other equation to replace the variable. Then solve the equation.

Step 3 Substitute the value from Step 2 into either equation, and solve for the other variable. Write the solution as an ordered pair.

GuidedPractice

~~1A~~ $y = 4x - 6$
$5x + 3y = -1$

$y = 4 \cdot 1 + -6$
$y = 4 + -6$

$(1, -2)$

$5x + 3(4x - 6) = -1$

$5x + 12x - 18 = -1$
$+18 \quad +18$

$\frac{17x}{17} = \frac{17}{17}$

$x = 1$

1B. $2x + 5y = -1$
$y = 3x + 10$

$(-3, 1)$

How is this problem different?

Example 2 Solve and then Substitute

Use substitution to solve the system of equations.

$x + 2y = 6$
$3x - 4y = 28$

$x + 2y = 6$
$-2y \quad -2y$
$x = -2y + 6$

$3(-2y+6) - 4y = 28$
$-6y + 18 - 4y = 28$
$-10y + 18 = 28$
$-18 \quad -18$
$\frac{-10y}{-10} = \frac{10}{-10}$
$y = -1$

$(4, -1)$

$x = -2 \cdot -1 + 6$
$= 2 + 6$

GuidedPractice

2A. $4x + 5y = 11$

$y - 3x = -13$

$+3x \quad +3x$

$y = 3x - 13$

$(4, -1)$

2B. $x - 3y = -9$
$5x - 2y = 7$

$x - 3y = -9$
$+3y \quad +3y$

$x = 3y - 9$

$5(3y - 9) - 2y = 7$

$\frac{2x}{2} = \frac{6y}{2} - \frac{14}{2}$ $\quad x = 3y - 7$

$3y - 1x = 7$

$3y - 1(3y - 7) = 7$

$3y - 3y + 7 = 7$

$7 = 7$

all numbers