Algebra 1 6.2

Solve systems of equations using substitution method

Solve problems using substitution of equations

solve

solve by graphing

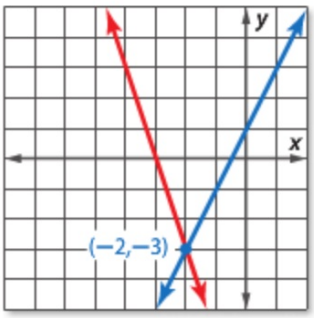
substitution

substitution method

replace with something =

activity: cut & paste

whiteboards



Are there ever any complications when solving by graphing?

recipe: if you run out of one ingredient...
coach: two players are equally skilled...

$$5x + y = 18$$
$$5 \cdot 3 + y = 18$$
$$15 + y = 18$$
$$-15 \quad -15$$

Cut & paste activity

$3x - y = 1$

$3 \cdot -1 - -4 = 1$

$-3 + 4 = 1$

"$(-1, -4)$"

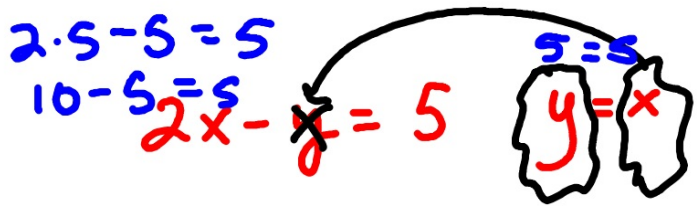
$-4 = 4 \cdot -1$

$y = 4x$

$3x - 4x = 1$

$-1x = 1$

$x = -1$



$2x - x = 5$

$x = 5$

$2 \cdot 5 - y = 5$

$10 - y = 5$

$-10 \quad -10$

$-y = -5$

$\frac{-y}{-1} = \frac{-5}{-1}$

$(5, 5)$

Example 1 Solve a System by Substitution

Use substitution to solve the system of equations.

$y = 2x + 1$ ← **Step 1** The first equation is already solved for y.

$3x + y = -9$

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

$5x + 1 = -9$

$-1 \quad -1$

$5x = -10$

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

$y = 2 \cdot -2 + 1$

$y = -4 + 1$

$y = -3$

$(-2, -3)$

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

KeyConcept Solving by Substitution

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

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. $y = 4x - 6$
$5x + 3y = -1$

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

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

$17x - 18 = -1$

$+18 \quad +18$

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

"(1, -2)"

$-2 = 4 \cdot 1 + 2$

$-2 = 4 + -6$

$5 \cdot 1 + 3 \cdot -2 = -1$

$5 + -6 = -1$

$2 \cdot -3 + 5 \cdot 1 = -1$

$-6 + 5 = -1$

$(-3, 1)$

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

$y = 3x + 10$

$1 = 3 \cdot -3 + 10$

$1 = -9 + 10$

$y = 3 \cdot -3 + 10$

$= -9 + 10$

$2x + 5(3x + 10) = -1$

$2x + 15x + 50 = -1$

$17x + 50 = -1$

$-50 \quad -50$

$\frac{17x}{17} = \frac{-51}{17}$

$x = -3$

How is this problem different?

Example 2 Solve and then Substitute

Use substitution to solve the system of equations.

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

$\Rightarrow x = -2y + 6$

$(8, -1)$

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

$8+2\cdot-1=6$
$8+-2=6$

$3\cdot8-4\cdot-1=28$
$24+4=28$

$x = -2\cdot-1+6$
$x = 2+6$
$x = 8$

GuidedPractice

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

$y - 3x = -13$

$+3x \quad +3x$

$y = 3x + -13$

6.2 skills

1-11 odd

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