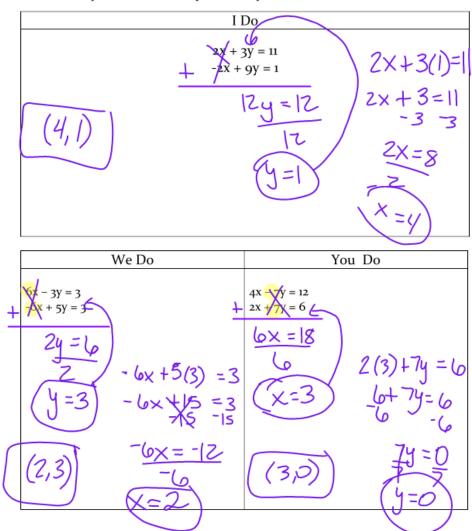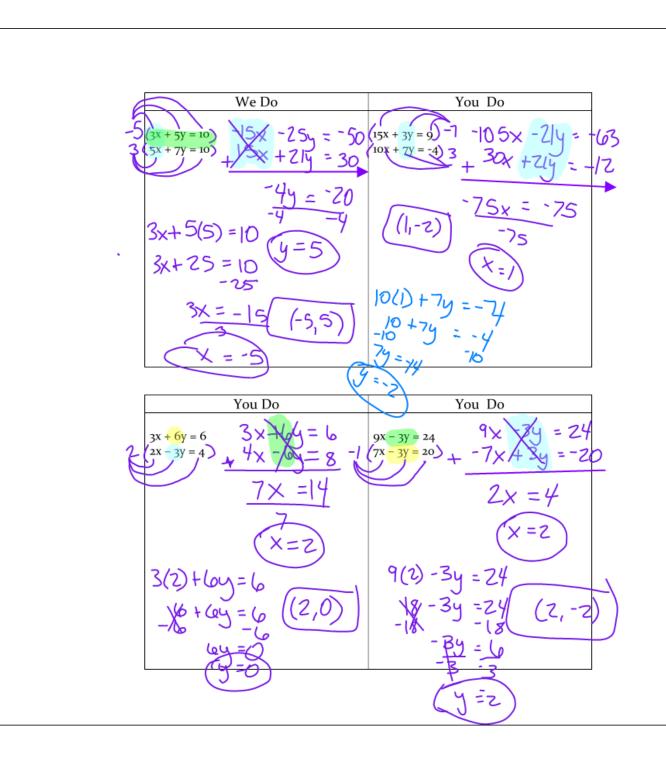# Solving Systems by Elimination

Example 1: Solving Systems of Linear Equations

Solve the system of linear equations by elimination.

I Do
$2x + 3y = 11$ $+ \quad -2x + 9y = 1$ $12y = 12$ $\overline{} \quad 12$ $y = 1$ $(4, 1)$ $2x + 3(1) = 11$ $2x + 3 = 11$ $\quad -3 \quad -3$ $2x = 8$ $\overline{} \quad 2$ $x = 4$

We Do	You Do
$6x - 3y = 3$ $+ \quad -6x + 5y = 3$ $2y = 6$ $\overline{} \quad 2$ $y = 3$ $(2,3)$	$4x - 7y = 12$ $+ \quad 2x + 7y = 6$ $6x = 18$ $\overline{} \quad 6$ $x = 3$ $(3, 0)$
$-6x + 5(3) = 3$ $-6x + 15 = 3$ $\quad\quad -15 \quad -15$ $-6x = -12$ $\overline{} \quad -6$ $x = 2$	$2(3) + 7y = 6$ $6 + 7y = 6$ $-6 \quad\quad -6$ $7y = 0$ $\overline{} \quad 7$ $y = 0$

We Do	You Do

We Do

$-5(3x + 5y = 10)$
$3(5x + 7y = 10)$

$-15x - 25y = -50$
$+15x + 21y = 30$

$-4y = -20$
$\dfrac{-4y}{-4} = \dfrac{-20}{-4}$

$y = 5$

$3x + 5(5) = 10$
$3x + 25 = 10$
$-25 \quad -25$

$3x = -15$
$\dfrac{3x}{3}$

$x = -5$

$(-5, 5)$

You Do

$15x + 3y = 9) \; -7$
$10x + 7y = -4) \; 3$

$-105x - 21y = -63$
$+ 30x + 21y = -12$

$-75x = -75$
$\dfrac{-75x}{-75} = \dfrac{-75}{-75}$

$x = 1$

$(1, -2)$

$10(1) + 7y = -4$
$10 + 7y = -4$
$-10 \qquad -10$
$7y = -14$
$y = -2$

You Do	You Do

You Do

$3x + 6y = 6$
$2(2x - 3y = 4)$

$3x + 6y = 6$
$4x - 6y = 8$

$7x = 14$
$\dfrac{7x}{7} = \dfrac{14}{7}$

$x = 2$

$3(2) + 6y = 6$
$6 + 6y = 6$
$-6 \quad -6$

$6y = 0$
$y = 0$

$(2, 0)$

You Do

$9x - 3y = 24$
$-1(7x - 3y = 20)$

$9x - 3y = 24$
$-7x + 3y = -20$

$2x = 4$

$x = 2$

$9(2) - 3y = 24$
$18 - 3y = 24$
$-18 \qquad -18$
$-3y = 6$
$\dfrac{-3y}{-3} = \dfrac{6}{-3}$
$y = 2$

$(2, -2)$

You Do	You Do

$x + 2y = 9$
$3x + 2y = 7$

$-x - 2y = -9$
$3x + 2y = 7$

$2x = -2$
$\boxed{x = -1}$

$-1 + 2y = 9$
$+1 \qquad +1$

$2y = 10$

$\boxed{y = 5}$

$\boxed{(-1, 5)}$

$3(2x - 3y = -11)$
$-2(3x + 2y = 29)$

$6x - 9y = -33$
$-6x - 4y = -58$

$\dfrac{-13y = -91}{-13}$

$\boxed{y = 7}$

$2x - 3(7) = -11$
$2x - 21 = -11$
$\qquad +21$
$2x = 10 \quad \boxed{x = 5}$

$\boxed{(5, 7)}$

You Do	You Do
$-2x + 3y = 25$ $-2x + 6y = 58$	$-x + 8y = -32$ $3x - y = 27$

Example 2: Application

Misti is selling candy for $5 per can and chips for $8 per can. If she sells a total of 240 cans and receives a total of $1,614, how many of each did she sell?

I Do

Kailee is selling candy for $2 per can and chips for $5 per can. If she sells a total of 220 cans and receives a total of $695, how many of each did she sell?

We Do