# Day Two

# 5.3 Solving System of Equations

# by Elimination

## What is different about this system?

Solve the system of linear equations by elimination.

$$2(-10x + 3y = 1)$$  Equation 1
$$-5x - 6y = 23$$  Equation 2

### Core Vocabulary
*Previous*
coefficient

### Solving Linear Systems by Elimination

**Core Concept**

**Solving a System of Linear Equations by Elimination**

**Step 1** Multiply, if necessary, one or both equations by a constant so at least one pair of like terms has the same or opposite coefficients.
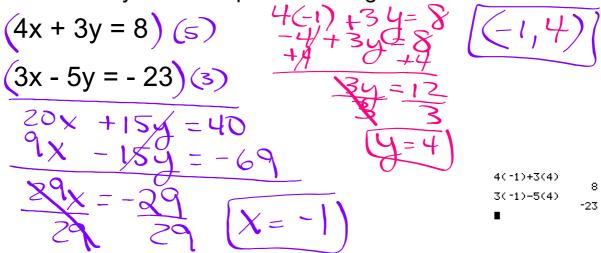
**Step 2** Add or subtract the equations to eliminate one of the variables.

**Step 3** Solve the resulting equation.

**Step 4** Substitute the value from Step 3 into one of the original equations and solve for the other variable.

Jan 14-9:42 AM

## Example 4:

Solve the system of equations using elimination.

$(4x + 3y = 8)$ $(5)$

$(3x - 5y = -23)$ $(3)$

$20x + 15y = 40$
$9x - 15y = -69$

$29x = -29$

$\dfrac{29x}{29} = \dfrac{-29}{29}$     $\boxed{x = -1}$

$4(-1) + 3y = 8$
$-4 + 3y = 8$
$+4 \qquad +4$

$\dfrac{3y}{3} = \dfrac{12}{3}$

$\boxed{y = 4}$

$\boxed{(-1, 4)}$

$4(-1)+3(4)$   8
$3(-1)-5(4)$   -23
■

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## Example 5:

A business with two locations buys seven large delivery trucks and five small delivery trucks. Location A receives three large trucks and two small trucks for a total cost $270,000. Location B receives four large trucks and three small trucks for a total cost of $375,000. What is the cost of each type of truck?

Let x = cost of small truck

Let y = cost of large truck

Equation 1 is about Location A $(3y + 2x = 270,000)$ $(3)$

Equation 2 is about Location B. $(4y + 3x = 375,000)$ $(-2)$

$3(60,000) + 2x = 270,000$
$180,000 + 2x = 270,000$
$-180,000 \qquad -180,000$

$\dfrac{2x}{2} = \dfrac{90,000}{2}$

$\boxed{x = 45,000}$

$9y + 6x = 810,000$
$8y - 6x = -750,000$

$\boxed{y = 60,000}$

$\boxed{\text{The cost of a large truck is } \$60,000, \text{ & the cost of a small truck is } \$45,000}$

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**2**

# COMMON ERROR

When multiplying through by the constant, be sure that you multiply EVERY TERM by the constant.

## Concept Summary

### Methods for Solving Systems of Linear Equations

| Method | When to Use |
|---|---|
| Graphing (Lesson 5.1) | To estimate solutions |
| Substitution (Lesson 5.2) | When one of the variables in one of the equations has a coefficient of 1 or −1 |
| Elimination (Lesson 5.3) | When at least one pair of like terms has the same or opposite coefficients |
| Elimination (Multiply First) (Lesson 5.3) | When one of the variables cannot be eliminated by adding or subtracting the equations |

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# Homework Assignment

Day One 5.3 WS

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A: 8, 10, 16, 18, 20, 22, 26, 38, 40, 42

B: 8 - 16(e), 20 - 26 (e), 36 - 40

C: 6 - 12(e), 16 - 24(e), 36, 40