

## System of Equations

A **system of equations** is a group of equations with the **same variables**.

$$3 + 2 = 5$$

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



$$x + y = 5$$

$$x - 5y = -7$$

$$(3, 2)$$

$$2a + b = 3$$

$$3a - 2b = 8$$

$$a = 2; b = -1$$

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

$$3(2) - 2(-1) = 8$$



The **solution** to a **system** of equations is the ordered pair  $(x, y)$  that satisfies **both equations**

We can solve a **system of equations** by using the method of substitution.

Three outcomes when solving a **system** by substitution

$$x = 2$$

$$y = -3$$

One Solution

$$3 = 3$$

True Statement

Infinitely Many Solutions

$$5 \neq 19$$

False Statement

No Solutions

Solve the system of equations by elimination

$$3x - 3y = 12$$

$$2x + 3y = 13$$

Solve the system of equations by elimination

$$x - 2y = 13$$

$$3x + 2y = 15$$

Solve the system of equations by elimination

$$-2x + y = 14$$

$$2x - 5y = -6$$

Solve the system of equations by elimination

$$2x + 5y = 17$$

$$6x - 5y = -9$$

Solve the system of equations by elimination

$$-3x + 6y = 12$$

$$3x - 6y = 9$$

Three outcomes when solving a system by elimination

$$x = 2$$
$$y = -3$$

One Solution

$$3 = 3$$

True Statement

Infinitely Many Solutions

$$5 \neq 19$$

False Statement

No Solutions