How can we find the solution to a system of linear equations?

A system of linear equations consists of two or more linear equations with the same variables.

A solution to a system of linear equations in two variables is an ordered pair that makes both equations true.

Is the given point a solution to the linear system?

Ex 1: (-1, 1)

$$\begin{cases} y = 2x + 3 & ① \\ y = -3x + 18 & ② \end{cases}$$

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

② $1 = -3(-1) + 18$
$1 = 3 + 18$
$1 = 21$ ✗

$\boxed{\text{Not a solution to the system.}}$

Ex 2: (3, 2)

$$\begin{cases} x + 2y = 7 & ① \\ 3x - 2y = 5 & ② \end{cases}$$

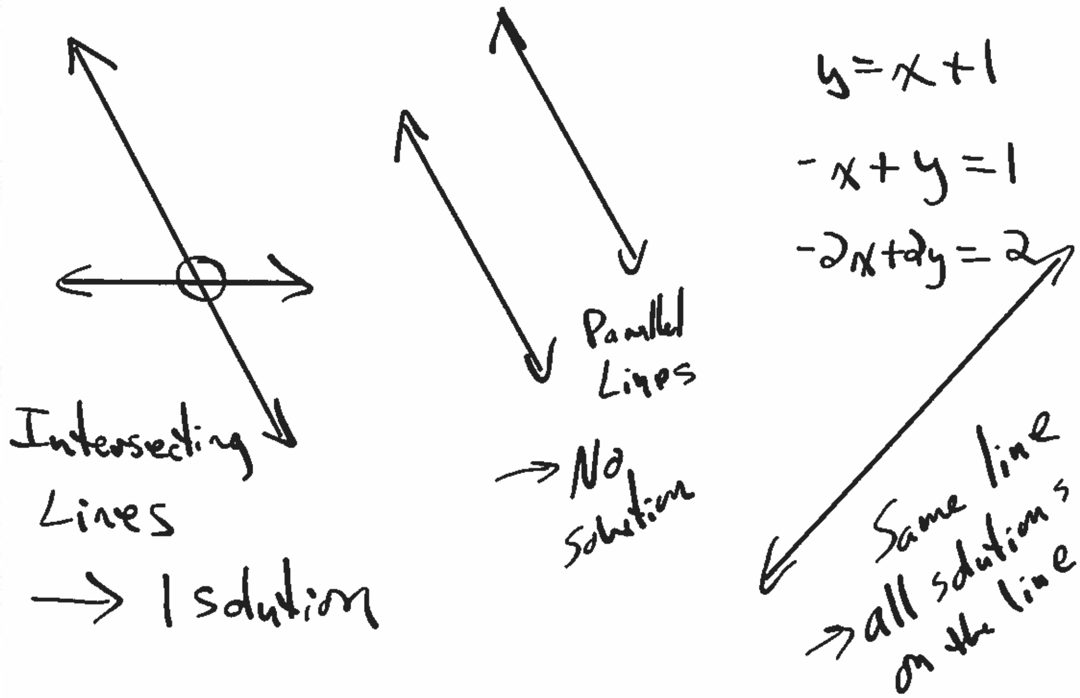
① $3 + 2(2) = 7$
$3 + 4 = 7$ ✓

② $3(3) - 2(2) = 5$
$9 - 4 = 5$ ✓

$\boxed{\text{This is a solution to the system.}}$

Method 1: Solve Systems by Graphing (7.1)

What could a system of two linear equations look like?



$y = x + 1$

$-x + y = 1$

$-2x + 2y = 2$

Ex 1: Solve and check.

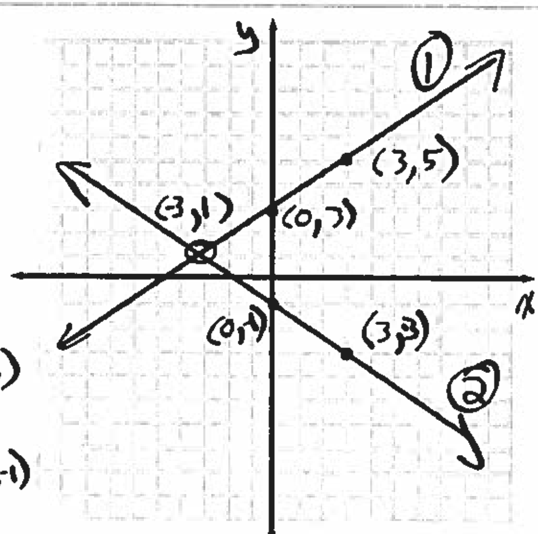
$$\begin{cases} -2x + 3y = 9 & ① \\ 4x + 6y = -6 & ② \end{cases}$$

① $3y = 2x + 9$

$y = \frac{2}{3}x + 3$ $m = \frac{2}{3}$ y-int $(0,3)$

② $6y = -4x - 6$

$y = -\frac{2}{3}x + (-1)$ $m = -\frac{2}{3}$ y-int $(0,-1)$



$\boxed{\text{Solution: } (-3,1)}$

Check: ① $-2(-3) + 3(1) = 9$

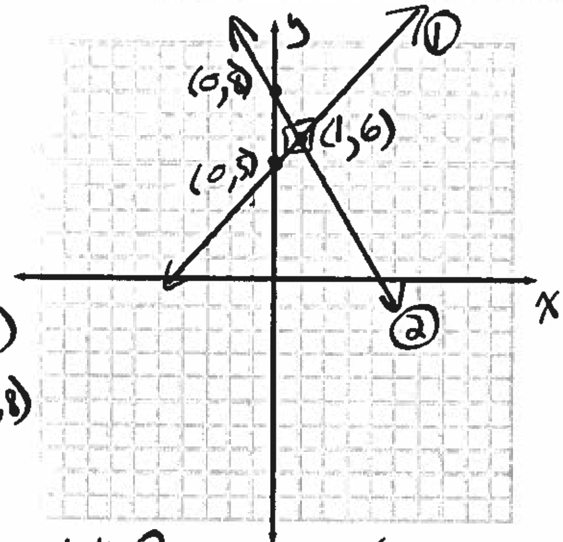
$6 + 3 = 9$ ✓

② $4(-3) + 6(1) = -6$

$-12 + 6 = -6$ ✓

Ex 2: Solve and Check.

$$\begin{cases} -x + y = 5 & ① \\ 2x + y = 8 & ② \end{cases}$$



① $y = x + 5$ $m = 1$ y-int $(0,5)$

② $y = -2x + 8$ $m = -2$ y-int $(0,8)$

Solution: $(1,6)$

Check: ① $-1 + 6 = 5$ ✓

② $2(1) + 6 = 8$

$2 + 6 = 8$ ✓

Assignment #35

p. 430-431 #1, 3-15