Name: _____ Date: _____

Learning Goal 7.1	Solve systems of linear equations graphically.

Example Wayne received and sent 60 text messages on his cell phone this weekend. He sent 10 more text messages than he received.

a. Create a system of linear equations to model this situation.

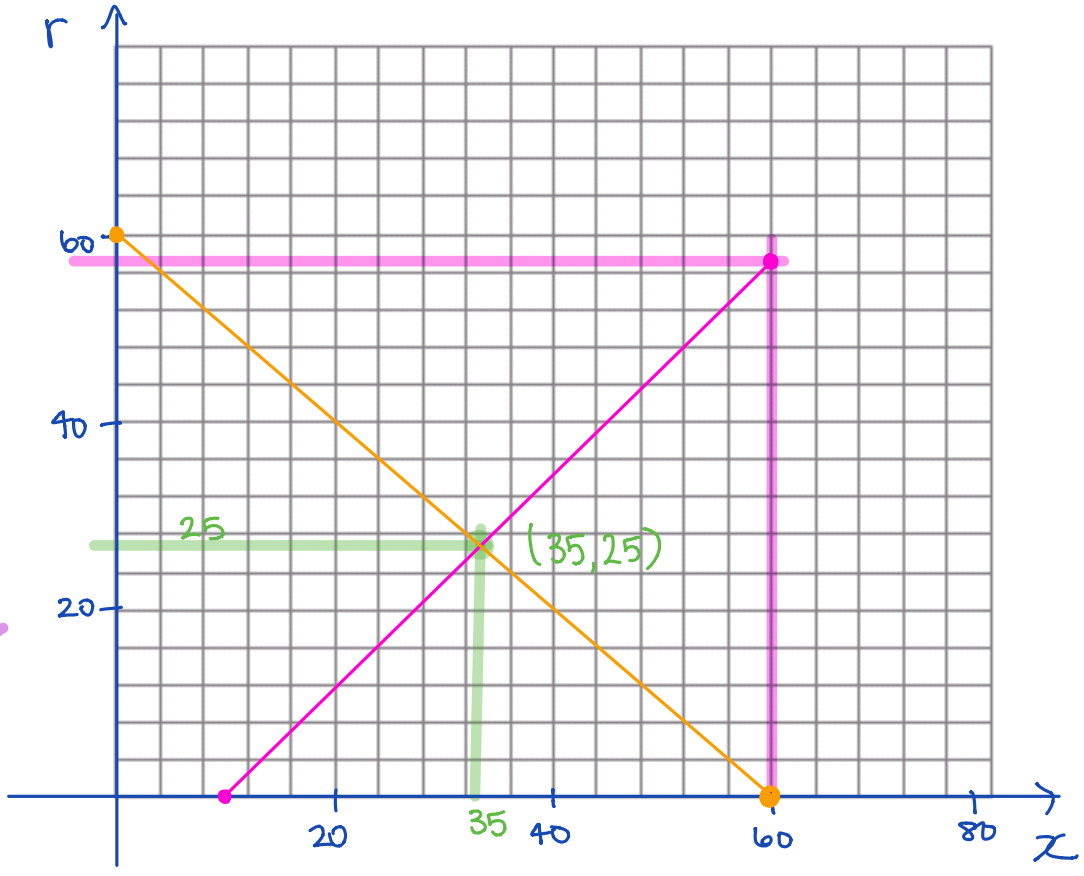
let x = the # of text messages set
r = the # of text messages received

$$x + r = 60$$
$$x - 10 = r \quad \text{or} \quad x = r + 10$$

* check to ensure it makes sense! *

b. Graph the linear system to solve the problem: how many text messages did Wayne send and receive?

He sent 35 messages and received 25.



c. Verify your solution.

CHECK: $35 + 25 = 60$ ✓

$35 = 25 + 10$
$35 = 35$ ✓

Terminology

a. Point of Intersection

- where the 2 equations cross
- the solution to the system.

b. System of Linear Equations

- working with more than one equation at once.

c. Satisfies an equation

- does the equation hold for that coordinate?

d. Solution to a System of Linear Equations

* needs to be an ordered pair (x, y)

Example For which of the following systems is the point $(-1, 1)$ a solution? (x y)

a. $5x + 6y = 1$, $6x + 2y = -3$

$5(-1) + 6(1) = -5 + 6 = 1$ ✓

$6(-1) + 2(1) = -6 + 2 = -4$ ✗

Not a solution!

b. $3x + 4y = 1$, $5x - 3y = -8$

$3(-1) + 4(1) = -3 + 4 = 1$ ✓

$5(-1) - 3(1) = -5 - 3 = -8$ ✓

$(-1, 1)$ is a solution!

c. $3x - 4y = -6$, $3x + 3y = 1$

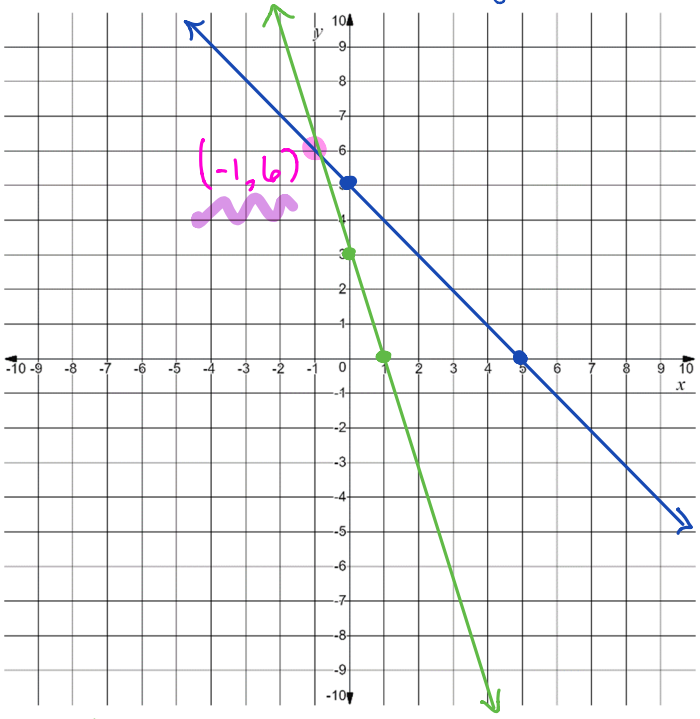
d. $2x + 3y = 1$, $4x + 6y = 2$

Example Solve the following systems graphically. Check your solution.

a. $x + y = 5$, $3x + y = 3$

x-int $x + 0 = 5$, $x = 5$

y-int $0 + y = 5$, $y = 5$

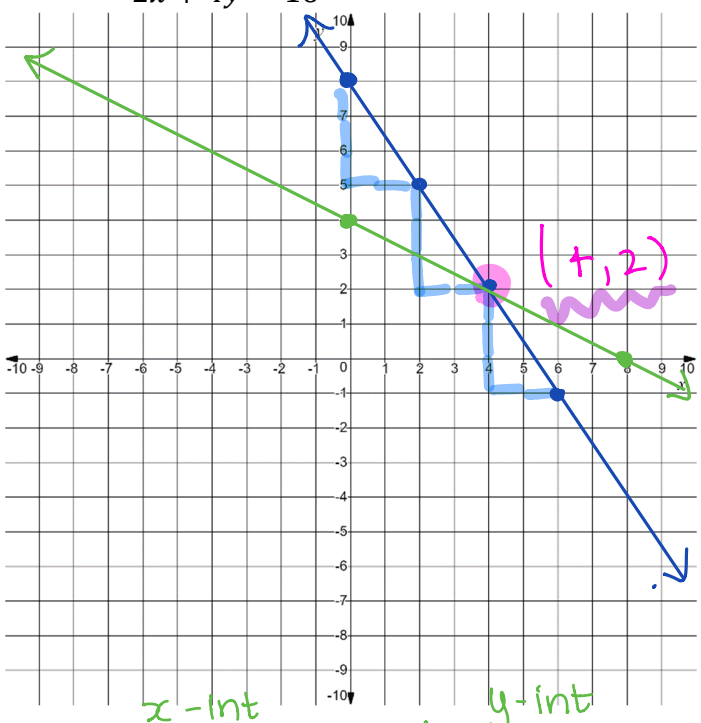


x-int $3x + 0 = 3$, $\frac{3x}{3} = \frac{3}{3}$, $x = 1$

y-int $3(0) + y = 3$, $y = 3$

b. $y = -\frac{3}{2}x + 8$, $2x + 4y = 16$

$\frac{-3}{+2} = \frac{+3}{-2}$



x-int $2x + 4(0) = 16$, $\frac{2x}{2} = \frac{16}{2}$, $x = 8$

y-int $2(0) + 4y = 16$, $\frac{4y}{4} = \frac{16}{4}$, $y = 4$

Check:

$(-1)+6$
$= 5$ ✓

$3(-1)+6$
$= -3+6$
$= 3$ ✓

Check: $-\frac{3}{2}(4)+8$
$= -6+8$
$= 2$ ✓

$2(4)+4(2)$
$= 8+8$
$= 16$ ✓