

DO NOW

Solve by graphing: $y = -x + 2$
 $2x - y = 2$

$$y = -x + 2$$

$$2x - y = 2$$

$$y = -x + 2 \quad 2x - y = 2$$

$$m = -\frac{1}{1} \quad -y = -2x + 2$$

$$b = 2 \quad y = \frac{-2x + 2}{-1}$$

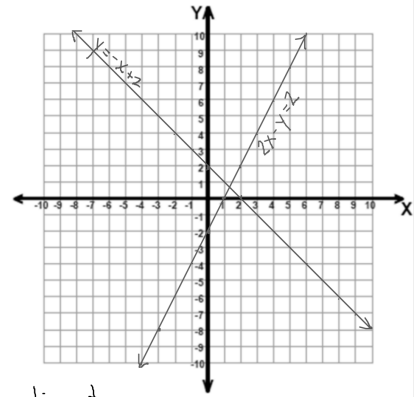
$$y = 2x - 2$$

$$m = \frac{2}{1}$$

$$b = -2$$

Guess: $(1, 1) \leftarrow$ NO
 (use check charts)
 $(12, 0.6) \leftarrow$ NO
 $(1.5, 1.5) \leftarrow$ NO

It would take a long time to find the answer by guessing.



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5.2 Solving Systems of Linear Equations By Substitution

- Procedure:
1. Replace one variable in terms of (using) the other.
 2. Solve for the remaining variable.
 3. Substitute to find the other variable.
 4. Check in both equations.

Examples:

1. $y = -x + 2$ $\leftarrow$ ** y is the same as $-x + 2$
 $2x - y = 2$

$$2x - (-x + 2) = 2$$

$$2x + x - 2 = 2$$

$$3x - 2 = 2$$

$$3x = 2 + 2$$

$$3x = 4$$

$$x = \frac{4}{3}$$

$$x = 1\frac{1}{3}$$

$$y = -x + 2$$

$$y = -1\frac{1}{3} + 2$$

$$y = \frac{2}{3}$$

$$\boxed{\left(1\frac{1}{3}, \frac{2}{3}\right)}$$

check:

y	$-x + 2$
$\frac{2}{3}$	$-1\frac{1}{3} + 2$
$\frac{2}{3}$	$\frac{2}{3} \checkmark$

$2x - y$	2
$2(1\frac{1}{3}) - \frac{2}{3}$	2
$\frac{8}{3} - \frac{2}{3}$	2
$\frac{6}{3}$	2
2	$2 \checkmark$

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2. $2x - 3y = 25$

$$x = 2 - 2y$$

$$2(2 - 2y) - 3y = 25$$

$$4 - 4y - 3y = 25$$

$$4 - 7y = 25$$

$$-7y = 25 - 4$$

$$-7y = 21$$

$$y = \frac{21}{-7}$$

$$y = -3$$

$$x = 2 - 2y$$

$$x = 2 - 2(-3)$$

$$x = 2 + 6$$

$$x = 8$$

$$\boxed{(8, -3)} \text{ OR } \boxed{\begin{matrix} x = 8 \\ y = -3 \end{matrix}}$$

check:

$2x - 3y$	25
$2(8) - 3(-3)$	25
$16 + 9$	25
25	$25 \checkmark$

x	$2 - 2y$
8	$2 - 2(-3)$
8	$2 + 6$
8	$8 \checkmark$

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3. $y = 4x - 3$

$$y = -2x + 9$$

$$-2x + 9 = 4x - 3$$

$$9 = 4x - 3 + 2x$$

$$9 + 3 = 4x + 2x$$

$$12 = 6x$$

$$\frac{12}{6} = x$$

$$2 = x$$

$$y = -2x + 9$$

$$y = -2(2) + 9$$

$$y = -4 + 9$$

$$y = 5$$

$$\boxed{x = 2}$$

$$\boxed{y = 5}$$

check:

y	$4x - 3$
5	$4(2) - 3$
5	$8 - 3$
5	$5 \checkmark$

y	$-2x + 9$
5	$-2(2) + 9$
5	$-4 + 9$
5	$5 \checkmark$

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4. $3x - 4y = 26$
 $x + 2y = 2 \Rightarrow x = 2 - 2y$

$$\begin{array}{lcl} 3(2-2y) - 4y = 26 & x + 2y = 2 & \\ 6 - 6y - 4y = 26 & x + 2(-2) = 2 & \\ -6y - 4y = 26 - 6 & x - 4 = 2 & \\ -10y = 20 & x = 2 + 4 & \\ y = \frac{20}{-10} & x = 6 & \\ y = -2 & \boxed{\begin{array}{l} x=6 \\ y=-2 \end{array}} & \end{array}$$

Check:

$$\begin{array}{r|l} 3x - 4y & 26 \\ \hline 3(6) - 4(-2) & 26 \\ 18 + 8 & 26 \\ 26 & 26 \checkmark \end{array} \quad \begin{array}{r|l} x + 2y & 2 \\ \hline 6 + 2(-2) & 2 \\ 6 - 4 & 2 \\ 2 & 2 \checkmark \end{array}$$

HOMework

Worksheet - HW 5.2