

Date: _____

Unit 6: Solving Systems of Linear Equations**6.1 Solving by Graphing & Number of Solutions**

Recall: To **SOLVE** an equation means to identify the value of the variable which satisfies the equation (makes the equation true).

Ex. Solve $2x - 1 = 9$

$$2x = 10$$

$$x = 5$$

$$2(5) - 1 = 9$$

$$9 = 9 \checkmark$$

System of Linear Equations:

$$2x - 3y = 5$$

$$x + 4y = 7$$

Two equations
with two variables

Ex. Solve the system graphically: $y = 2x$ and $y = x + 2$

$$\begin{matrix} \boxed{y = 2x} & \text{and} & \boxed{y = x + 2} \\ \uparrow & & \uparrow \\ (10, 20) & & (0, 2) \\ (1, 2) & & (1, 3) \end{matrix}$$

Algebraic Verification

$$y = 2x$$

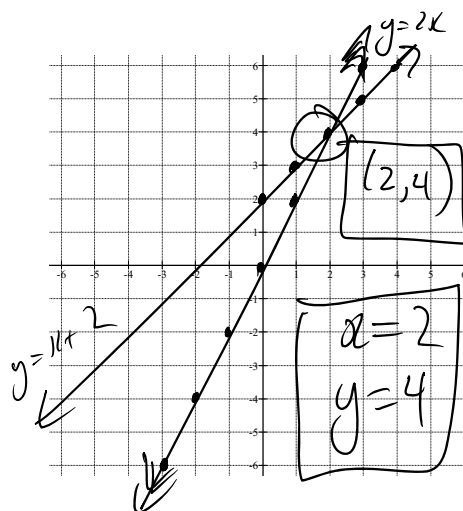
$$4 = 2(2)$$

$$4 = 4 \checkmark$$

$$y = x + 2$$

$$4 = 2 + 2$$

$$4 = 4 \checkmark$$



Solution (to a system of linear equations):

- an ordered pair that satisfies both equations
- the intersection of the graphs

Ex. Consider the system of linear equations $2x + y = 2$ and $x - y = 7$. Identify the solution of the system by graphing, then verify the solution.

$$2x + y = 2$$

$$y = -2x + 2$$

$$x - y = 7$$

$$y = x - 7$$

$$\boxed{(3, -4)}$$

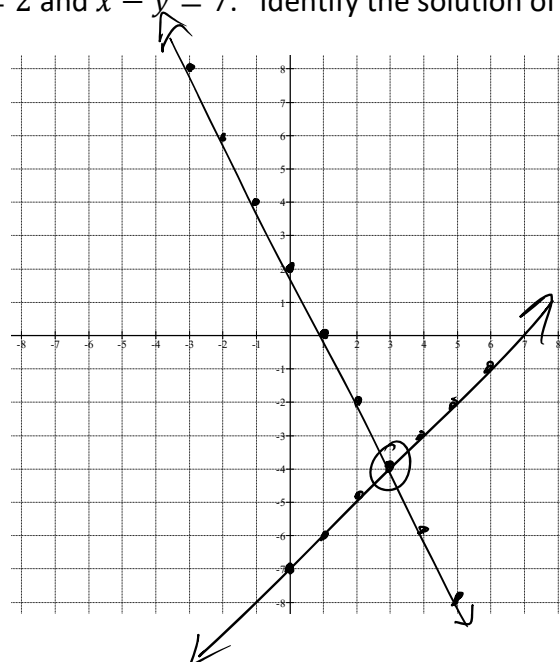
$$2(3) + (-4) = 2$$

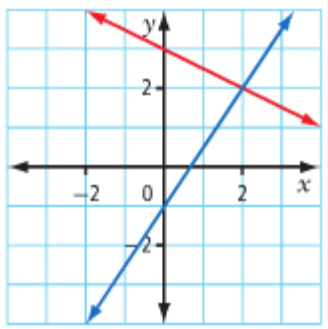
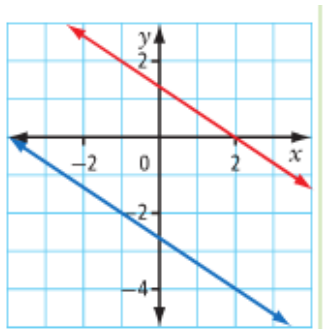
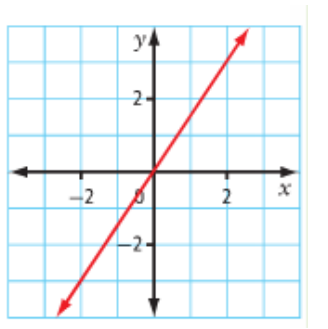
$$6 + (-4) = 2$$

$$2 = 2 \checkmark$$

$$(3) + (-4) = 7$$

$$-1 = 7 \checkmark$$



	Intersecting Lines	Parallel Lines	Coincident Lines
Number of Solutions	1	0	infinite ∞
Graph			
Slopes:	different	same	same
y-intercepts:	different or same	different	same

Before solving, you can predict the number of solutions by comparing the slopes

and the y-ints of the equations.

Ex. Predict the number of solutions for each system of linear equations. Explain your reasoning.

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

$m = 2$
 $y = \frac{1}{2}$
 different slopes
 $\therefore$ 1 solution

b) $4x + 10y = 30$
 $2x + 5y = 35$

$4x + 10y = 30$
 $10y = -4x + 30$
 $y = -\frac{2}{5}x + 3$
 $2x + 5y = 35$
 $5y = -2x + 35$
 $y = -\frac{2}{5}x + 7$
 slopes = but y-ints
 different
 $\therefore$ 0 solutions

c) $10x - 6y = -12$
 $21y = 42 + 35x$

$6y = 10x + 12$
 $y = \frac{5}{3}x + 2$
 $21y = 35x + 42$
 $y = \frac{5}{3}x + 2$

same slope &
 y-int
 $\therefore$ ∞ solutions

Practice:

Worksheet
 pg. 427/ # 5abc, 19
 pg. 454/ # 1 - 4, 6, 11, 12, 14