

"Teacher"

Graphing Systems with Special Solutions

Convert the equations to slope-intercept form. Solve the system by graphing.

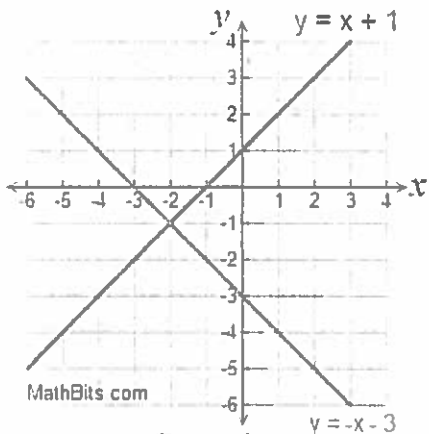
What observations can you make about the equations and the graphs?

Equations	Graph	Observations	Key Ideas
$\begin{array}{r} 3x - 2y = 6 \\ -3x \\ \hline -2y = -3x + 6 \\ \frac{-2}{-2} \quad \frac{-3}{-2} \\ y = \frac{3}{2}x - 3 \end{array}$ $\begin{array}{r} 1x + 1y = 2 \\ -1x \\ \hline 1y = -1x + 2 \\ \frac{1}{1} \quad \frac{1}{1} \\ y = -1x + 2 \end{array}$	<p>(2, 0)</p>	<ul style="list-style-type: none"> • Intersection point • Different slopes • Different y-intercepts 	<p>This system has 1 solution. Only 1 ordered pair will make both equations true.</p>
$\begin{array}{r} 2x - y = 1 \\ -2x \\ \hline -1y = -2x + 1 \\ \frac{-1}{-1} \quad \frac{-2}{-1} \\ y = 2x - 1 \end{array}$ $\begin{array}{r} 4x - 2y = 2 \\ -4x \\ \hline -2y = -4x + 2 \\ \frac{-2}{-2} \quad \frac{-4}{-2} \\ y = 2x - 1 \end{array}$		<ul style="list-style-type: none"> • Same line • Same slope • Same y-int $\frac{4x - 2y = 2}{2} = \frac{2}{2}$ $2x - 1y = 1$ <p>Same line!</p>	<p>This system has infinitely many solutions. Any ordered pair that works for 1 equation will work for the other.</p>
$\begin{array}{r} 2x - 3y = -3 \\ -2x \\ \hline -3y = -2x - 3 \\ \frac{-3}{-3} \quad \frac{-2}{-3} \\ y = \frac{2}{3}x + 1 \end{array}$ $\begin{array}{r} -2x + 3y = -9 \\ +2x \\ \hline 3y = 2x - 9 \\ \frac{3}{3} \quad \frac{2}{3} \\ y = \frac{2}{3}x - 3 \end{array}$		<ul style="list-style-type: none"> • Same slopes • Never intersect • Different y-intercepts 	<p>This system has no solution. No ordered pair will make both equations true.</p>

How many solutions does the system have?

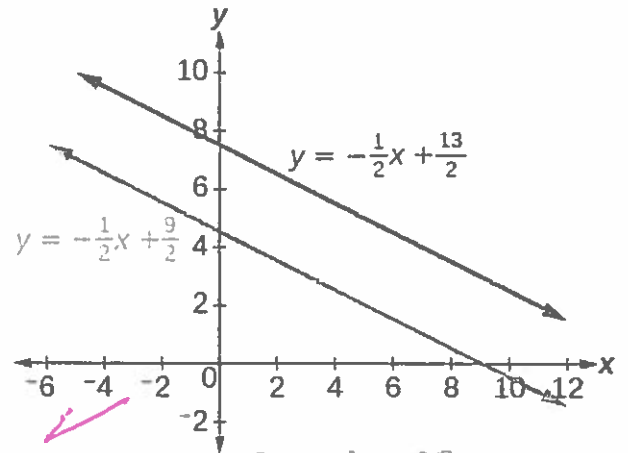
JUSTIFY YOUR ANSWER by discussing the graph AND the equations.

1)



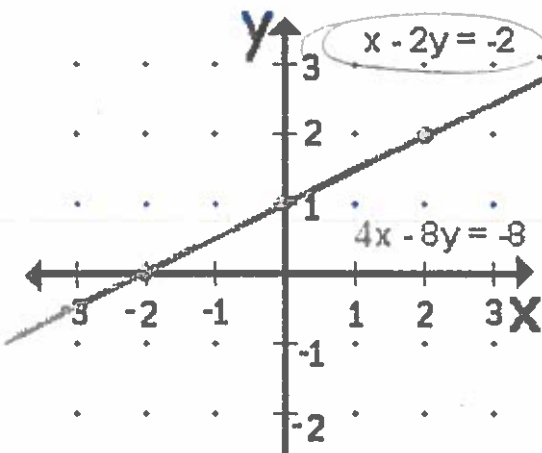
One solution
 • Only cross once
 Different slopes
 Different y-intercept.

2)



No solutions
 • Never intersect.
 Same slope.
 Different y-intercept

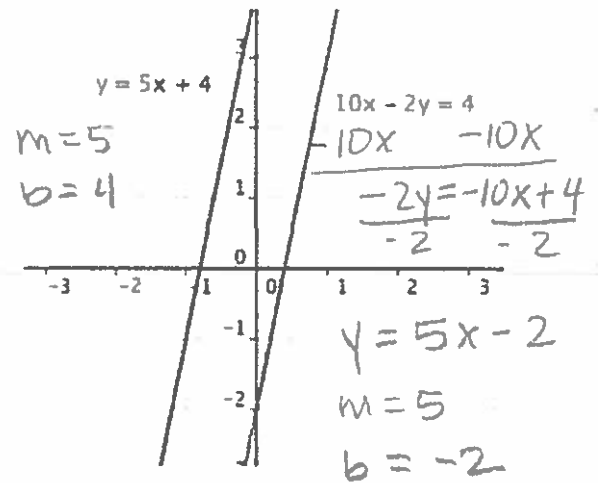
3)



Infinitely Many solutions
 same equations

$$\begin{array}{r} 4x - 8y = -8 \\ \hline 4 \quad 4 \\ \hline x - 2y = -2 \end{array}$$

4)



No solutions
 • Never intersect
 different y-intercept
 same slope