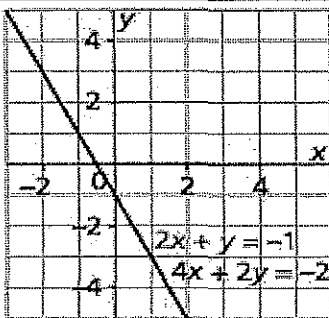
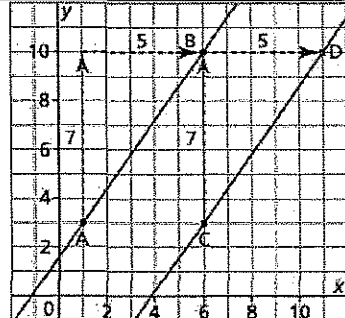
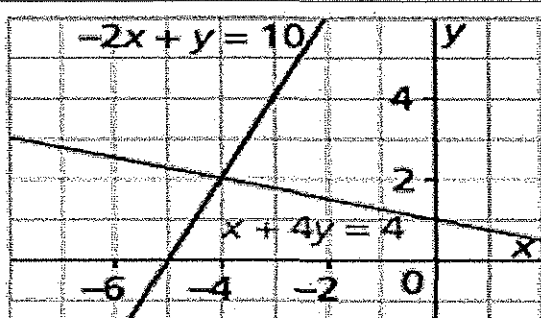


8.3 Number of Solutions

Bell Work

1. Systems of linear equations two or more linear equations involving common variables
2. Point of Intersection a point at which two lines touch or cross
3. Solution a point of intersection of the lines on a graph; an ordered pair that satisfies both equations; a pair of values occurring in the tables of values of both equations

Key Ideas

		
<p style="text-align: center;"><u>Coincident</u></p>	<p style="text-align: center;"><u>Parallel</u></p>	<p style="text-align: center;"><u>Intersecting</u></p>
<p>Lines that are on top of each other. They all share the same points! Infinite solutions, same slope, same y-intercept</p>	<p>No solution, same slope, different y-intercepts</p>	<p>One solution, different slopes, different y-intercepts</p>

Example 1: Determine the number of solutions in a linear system.

a) $x + y = -2$
 $-2x - 2y = 4$

b) $3x + y = -1$
 $-6x - 2y = 12$

Rearrange + find the slopes!

$$\begin{aligned} x + y &= -2 & -2x - 2y &= 4 \\ \hookrightarrow y &= -x - 2 & -2x - 4 &= 2y \\ & & -x - 2 &= y \end{aligned}$$

Wow! Same lines \rightarrow coincident + infinite solⁿ.

$$\begin{aligned} 3x + y &= -1 & -6x - 2y &= 12 \\ \hookrightarrow y &= -3x - 1 & -6x - 12 &= 2y \\ & & -3x - 6 &= y \end{aligned}$$

parallel lines.

\therefore no solⁿ.

Example 2: Given the equation $-2x + y = 4$, write another linear equation that will form a linear system with:

a) exactly one solution

↳ Rearrange $y = 2x + 4$.

Intersecting lines $\rightarrow y = 3x + 1$ (different slopes + intercepts)

b) no solution

Parallel lines $\rightarrow y = 2x + 3$ (same slopes, different intercepts)

c) infinite solutions

Coincident lines $\rightarrow y = 2x + 4$ (same slope, same intercept)

Your Turn

1. Determine the number of solutions in a linear system.

a) $x + y = 3$
 $-2x - y = -2$

b) $2x - 4y = -1$
 $3x - 6y = 2$

2. Given the equation $-6x + y = 3$, write another linear equation that will form a linear system with:

a. Exactly one solution

b. No solution

c. Infinite solutions

HW: Section 8.3 p. 454 #1-3 (pick 3 from each), 4, 5, 6, 7, 11, 12, 13