

What is a System of Equations?

A SET OF TWO OR MORE EQUATIONS WITH THE SAME VARIABLE.

What is a Solution to a System of Equations?

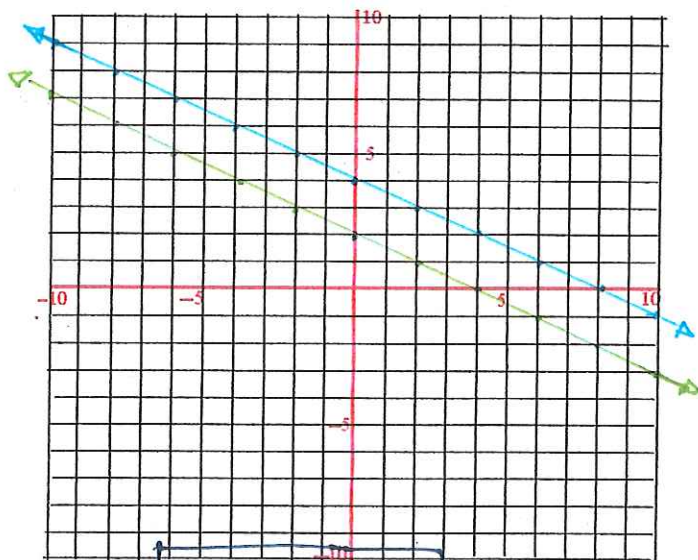
A SET OF VALUES FOR THE VARIABLES THAT SATISFY ALL THE EQUATIONS SIMULTANEOUSLY.

What does a Solution do for a System of Equations?

DEFINES THE POSSIBLE TYPES OF SOLUTIONS: NO SOLUTION (LINES DO NOT INTERSECT), ONE SOLUTION (POINT WHERE LINES INTERSECT), OR INFINITELY MANY SOLUTIONS (SAME LINE).

Solve.

1.)  $3x + 6y - 12 = 0 \rightarrow y = -\frac{1}{2}x + 2$   
 $x + 2y = 8 \rightarrow y = -\frac{1}{2}x + 4$



NO SOLUTION

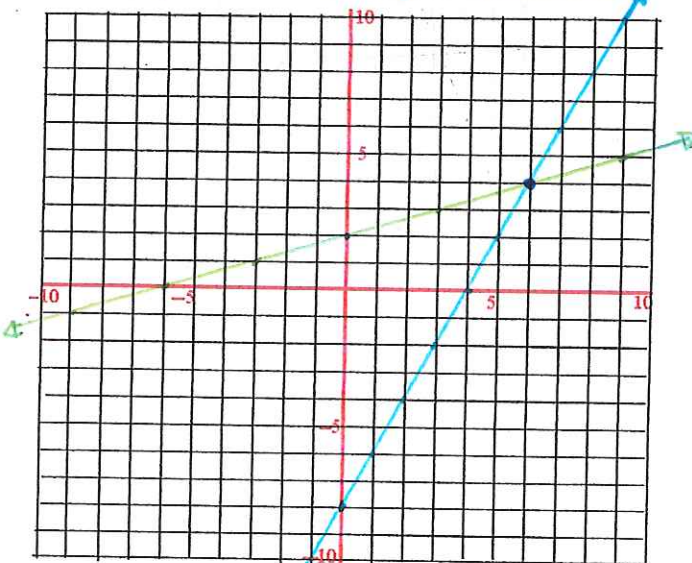
2.)  $3 = 4y + x \rightarrow y = -\frac{1}{4}x + \frac{3}{4}$   
 $8y = -2x + 6 \rightarrow y = -\frac{1}{4}x + \frac{3}{4}$



INFINITELY MANY SOLUTIONS

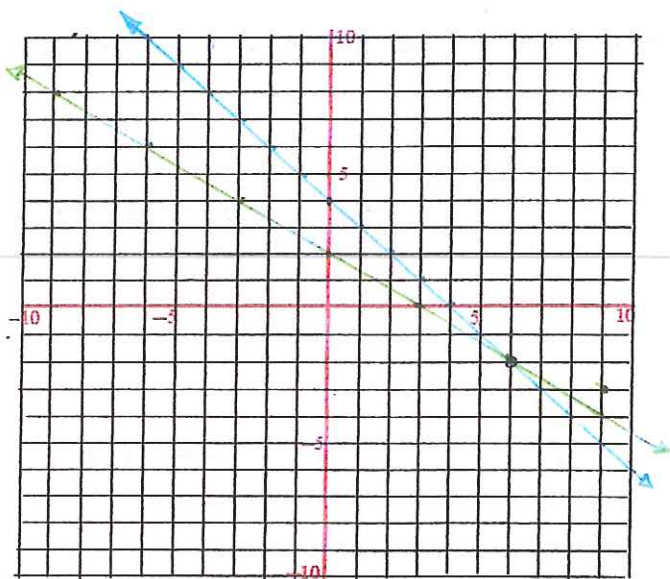
3.)  $-x + 3y = 6 \rightarrow y = \frac{1}{3}x + 2$   
 $2x - y = 8 \rightarrow y = 2x + 8$

1 solution  
(6, 4)



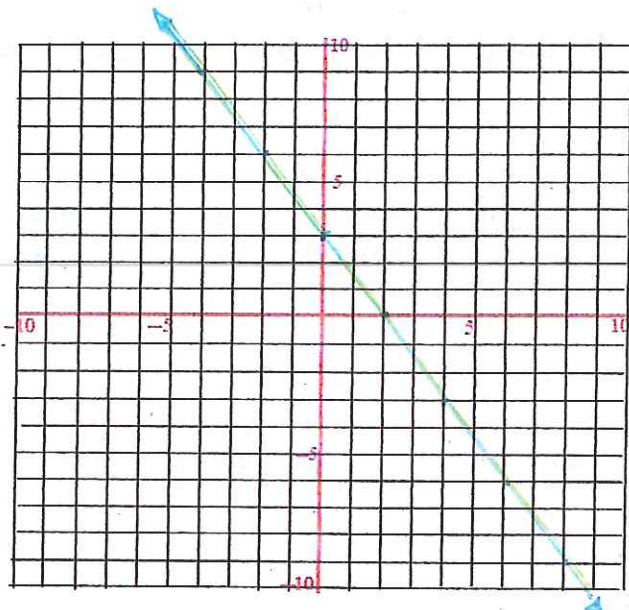
Graph each system of equations. Then determine the solution of the system.

4.  $2x + 3y = 9 \rightarrow y = -\frac{2}{3}x + 3$   
 $x + y = 4 \rightarrow y = -x + 4$



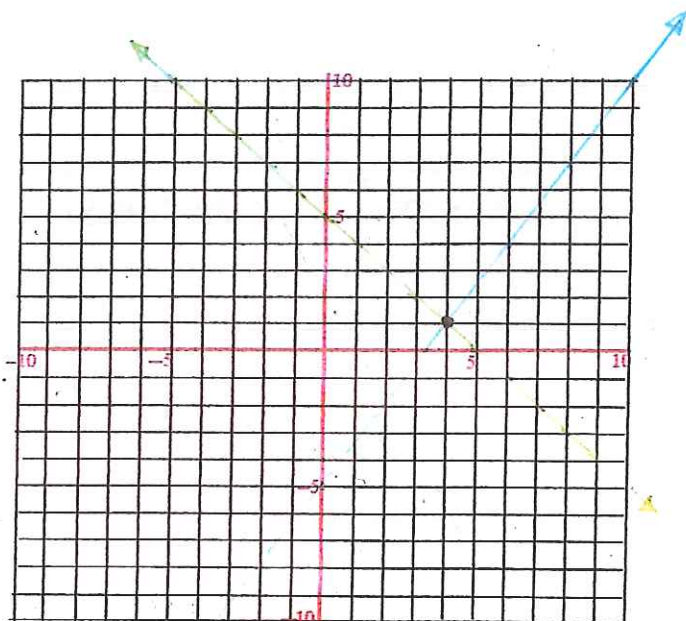
Solution: (6, -2)

5.  $2y + 3x = 6 \rightarrow y = -\frac{3}{2}x + 3$   
 $4y + 6x = 12 \rightarrow y = -\frac{3}{2}x + 3$



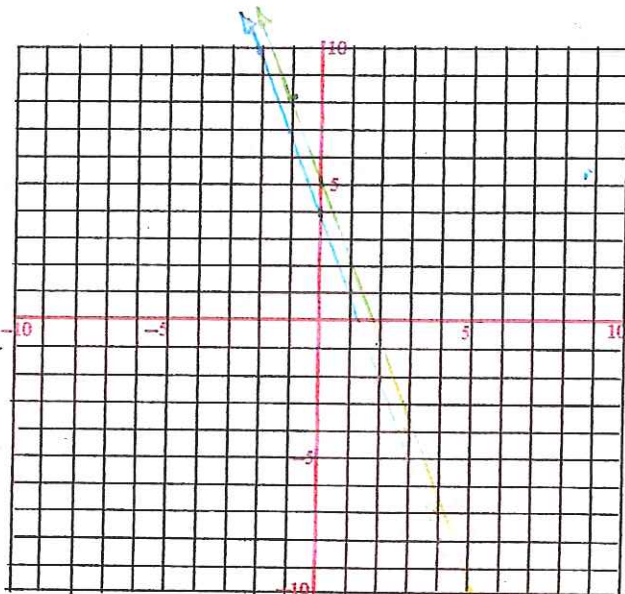
Solution: INFINITELY MANY SOLUTIONS

6.  $x + y = 5 \rightarrow y = -x + 5$   
 $3x - 2y = 10$



Solution: (4, 1)

7.  $y = -3x + 5$   
 $9x + 3y = 12 \rightarrow y = -3x + 4$



Solution: NO SOLUTION





Dashed Line (No Inclusion)

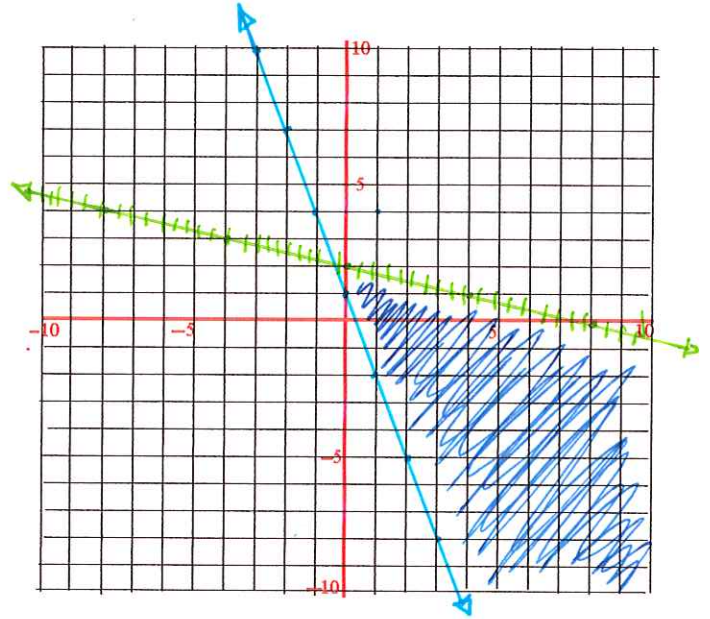
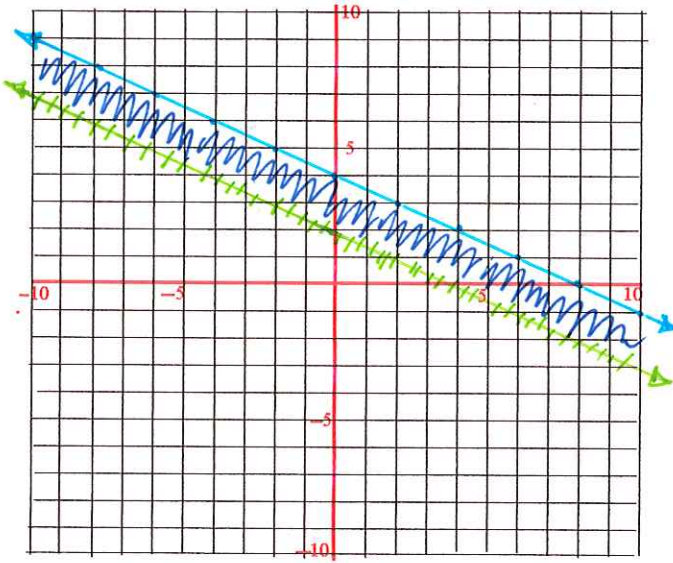
# System of Inequalities



Solid Line (Inclusion)

8.)  $3x + 6y - 12 > 0 \rightarrow y > -\frac{1}{2}x + 2$   
 $x + 2y \leq 8 \rightarrow y \leq -\frac{1}{2}x + 4$

9.)  $8 > 4y + x \rightarrow y < -\frac{1}{4}x + 2$   
 $8y \geq -24x + 8 \rightarrow y \geq -3x + 1$



10.)  $-x + 3y < 6 \rightarrow y < \frac{1}{3}x + 2$   
 $2x - y < 8 \rightarrow y > 2x - 8$

