



# Concepts and Examples

## Systems of Linear Inequalities in Two Variables

Based on power point presentations by Pearson Education, Inc.  
Revised by Ingrid Stewart, Ph.D.

# Learning Objective

Solve systems of two linear inequalities in two variables.

# Solve Systems of Two Linear Inequalities in Two Variables (1 of 5)

So far, we learned how to solve systems of two linear equations in two variables. Namely, we used the Substitution, Addition, or Matrix Method. We either found one solution, infinitely many solutions, or no solution. We agreed that such systems can also be solved graphically by examining the intersections of the two lines. However, we usually stayed away from this method because it can give inexact results.

**On the other hand, systems of two linear inequalities in two variables can only be solved graphically.** Specifically, we graph each inequality in the same *Rectangular Coordinate System*.

The solution set of the system will then be the overlapping region of the individual solution sets of the two inequalities.

# Solve of Systems of Two Linear Inequalities in Two Variables

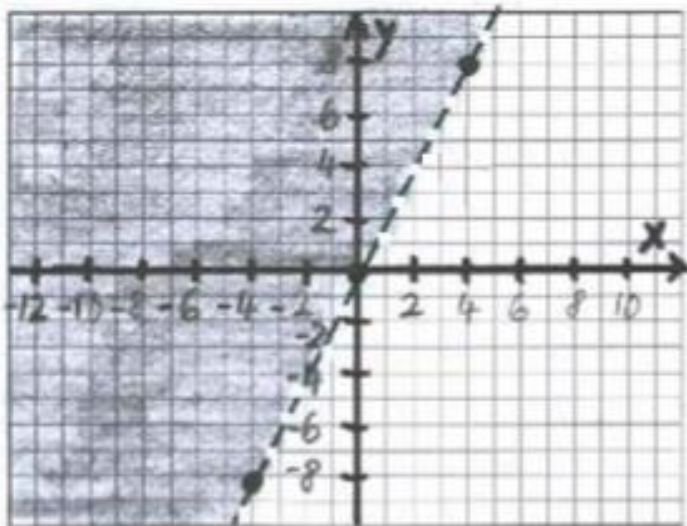
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Example 1:

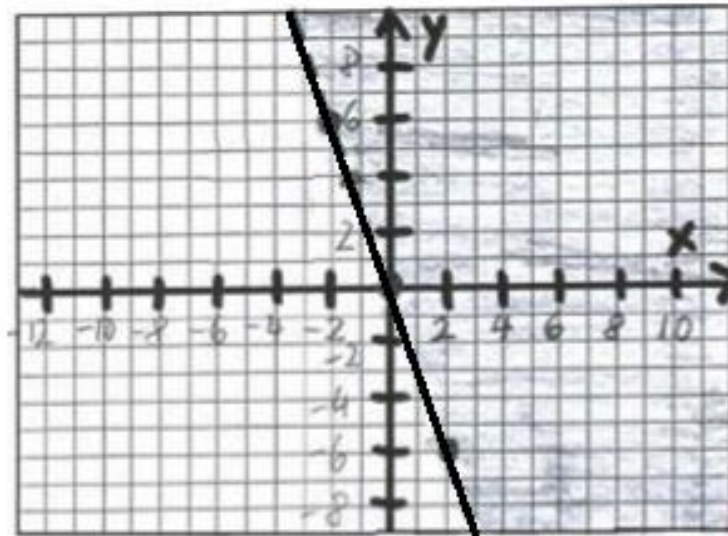
Given the following system

$$\begin{cases} y > 2x \\ 3y \geq -9x \end{cases}$$

The graph of  $y > 2x$ :



The graph of  $3y \geq -9x$ :

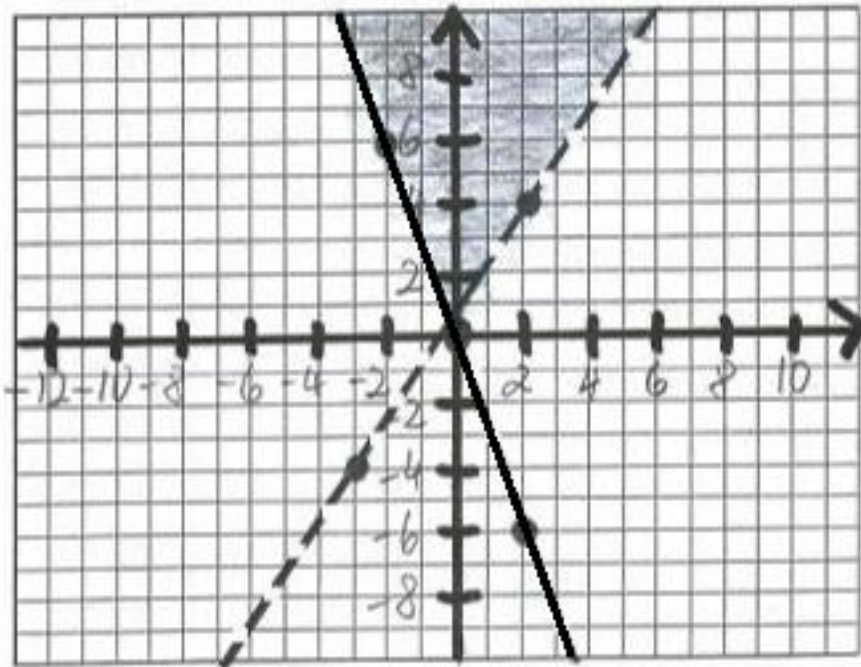


# Solve of Systems of Two Linear Inequalities in Two Variables

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Example 1 continued:

Given the individual graphs of the linear inequalities in the system, we can then determine the solution of the system by observing where the shaded regions overlap. See graph below.



It might take some imagination to determine the overlapping region! We can always print out the two graphs and then place them on top of each other!

# Solve of Systems of Two Linear Inequalities in Two Variables

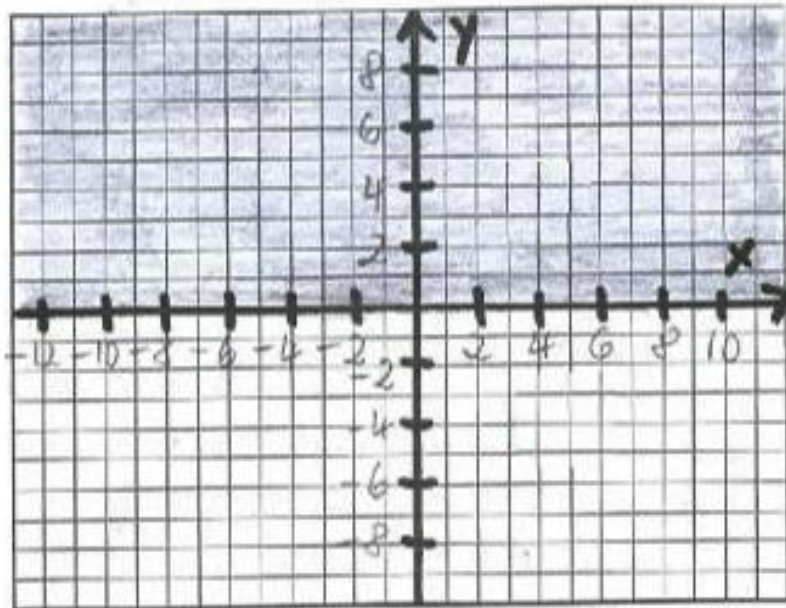
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Example 2:

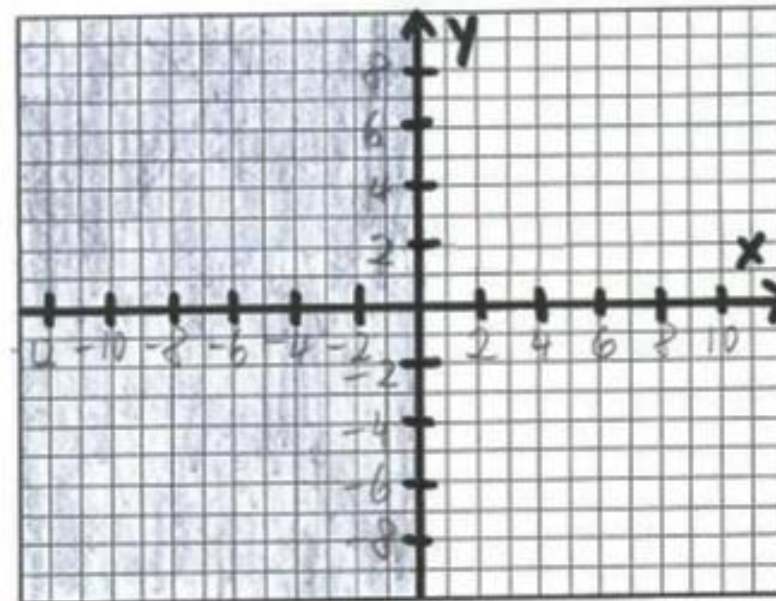
Given the following system

$$\begin{cases} y \geq 0 \\ x \leq 0 \end{cases}$$

The graph of  $y \geq 0$ :



The graph of  $x \leq 0$ :



# Solve of Systems of Two Linear Inequalities in Two Variables

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Example 2 continued:

Given the individual graphs of the linear inequalities in the system, we can then determine the solution of the system by observing where the shaded regions overlap. See graph below.

