

GOAL

Graph a system of linear inequalities to find the solutions of the system and use systems of linear inequalities to solve real-life problems

VOCABULARY

A **system of linear inequalities** is two or more linear inequalities in the same variables and is also called a system of inequalities.

A **solution** of a system of linear inequalities is an ordered pair that is a solution of each inequality in the system.

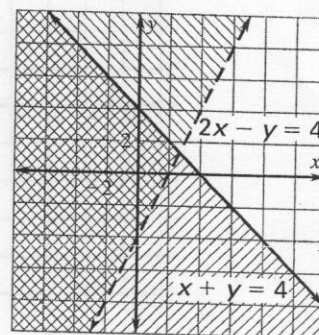
The **graph** of a system of linear inequalities is the graph of all solutions of the system.

EXAMPLE 1**Graphing a System of Two Inequalities**

Graph the system. $x + y \leq 4$ **Inequality 1**
 $2x - y < 4$ **Inequality 2**

SOLUTION

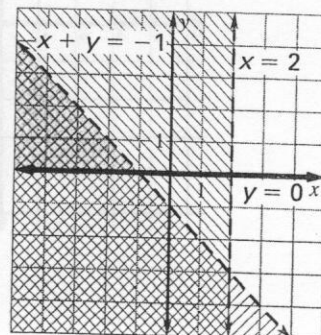
Begin by graphing the line $x + y = 4$ with a solid line. Shade the half-plane that satisfies $x + y \leq 4$, which is below the line. Next, graph the line $2x - y = 4$ with a dashed line. Shade the half-plane that satisfies $2x - y < 4$, which is to the left of the line. The graph of the system is the region shaded by both inequalities.

**EXAMPLE 2****Graphing a System of Three Inequalities**

Graph the system. $x + y < -1$ **Inequality 1**
 $x < 2$ **Inequality 2**
 $y \geq 0$ **Inequality 3**

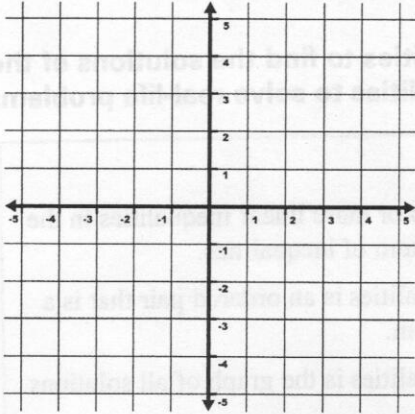
SOLUTION

Begin by graphing the line $x + y = -1$ with a dashed line. Shade the half-plane that satisfies $x + y < -1$, which is to the left of the line. Next, graph the vertical line $x = 2$ with a dashed line. Shade the half-plane that satisfies $x < 2$, which is to the left of the line. The inequality $y \geq 0$ restricts the solutions to the second quadrant. The graph of the system is the triangular region shown.

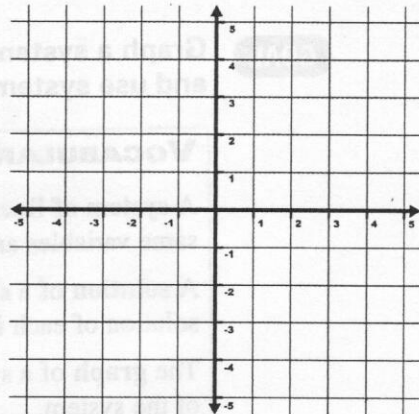


Graph the system of inequalities, shade the overlap

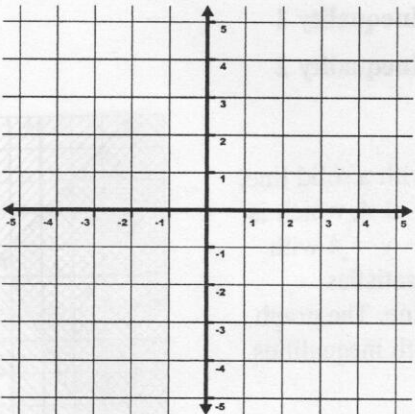
1. $x \geq -2$
 $x < 3$



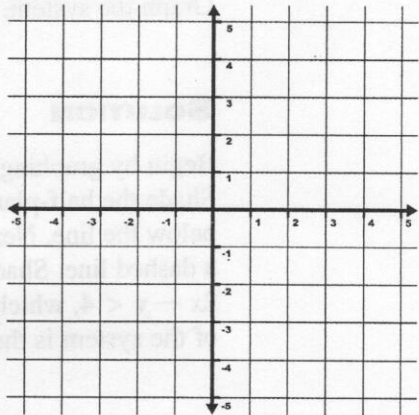
2. $y + 2 < 2x$
 $y < x + 6$



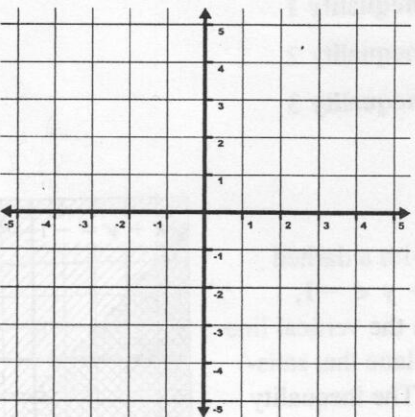
2. $y \leq 4$
 $x > -1$



3. $x + 2y \leq 6$
 $x - y \geq 3$
 $x \geq 0$



3. $3x + y \leq 5$
 $y \geq 1$
 $x \leq 1$



4. $x + y > 2$
 $y \leq 2$
 $x > 2$

