

6-6 Study Guide and Intervention**Systems of Inequalities**

Systems of Inequalities The solution of a **system of inequalities** is the set of all ordered pairs that satisfy both inequalities. If you graph the inequalities in the same coordinate plane, the solution is the region where the graphs overlap.

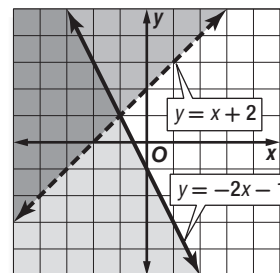
Example 1 Solve the system of inequalities

by graphing.

$y > x + 2$

$y \leq -2x - 1$

The solution includes the ordered pairs in the intersection of the graphs. This region is shaded at the right. The graphs of $y = x + 2$ and $y = -2x - 1$ are boundaries of this region. The graph of $y = x + 2$ is dashed and is not included in the graph of $y > x + 2$.

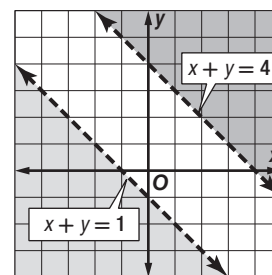
**Example 2** Solve the system of inequalities

by graphing.

$x + y > 4$

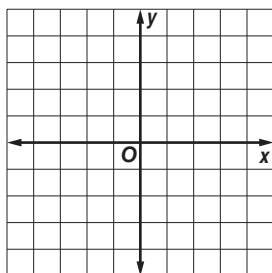
$x + y < -1$

The graphs of $x + y = 4$ and $x + y = -1$ are parallel. Because the two regions have no points in common, the system of inequalities has no solution.

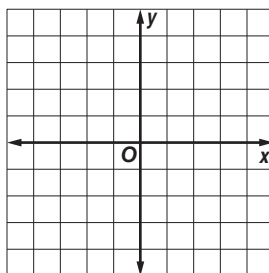
**Exercises**

Solve each system of inequalities by graphing.

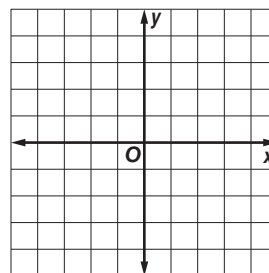
1. $y > -1$
 $x < 0$



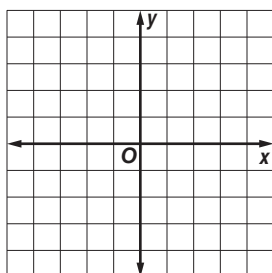
2. $y > -2x + 2$
 $y \leq x + 1$



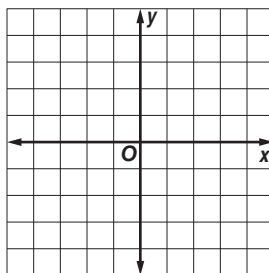
3. $y < x + 1$
 $3x + 4y \geq 12$



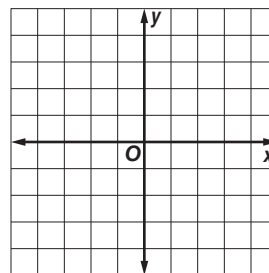
4. $2x + y \geq 1$
 $x - y \geq -2$



5. $y \leq 2x + 3$
 $y \geq -1 + 2x$



6. $5x - 2y < 6$
 $y > -x + 1$

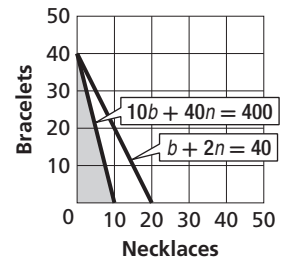


6-6 Study Guide and Intervention *(continued)***Systems of Inequalities**

Apply Systems of Inequalities In real-world problems, sometimes only whole numbers make sense for the solution, and often only positive values of x and y make sense.

Example

BUSINESS AAA Gem Company produces necklaces and bracelets. In a 40-hour week, the company has 400 gems to use. A necklace requires 40 gems and a bracelet requires 10 gems. It takes 2 hours to produce a necklace and a bracelet requires one hour. How many of each type can be produced in a week?



Let n = the number of necklaces that will be produced and b = the number of bracelets that will be produced. Neither n or b can be a negative number, so the following system of inequalities represents the conditions of the problems.

$$n \geq 0$$

$$b \geq 0$$

$$b + 2n \leq 40$$

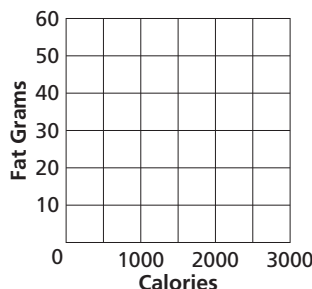
$$10b + 40n \leq 400$$

The solution is the set ordered pairs in the intersection of the graphs. This region is shaded at the right. Only whole-number solutions, such as (5, 20) make sense in this problem.

Exercises

For each exercise, graph the solution set. List three possible solutions to the problem.

- 1. HEALTH** Mr. Flowers is on a restricted diet that allows him to have between 1600 and 2000 Calories per day. His daily fat intake is restricted to between 45 and 55 grams. What daily Calorie and fat intakes are acceptable?



- 2. RECREATION** Maria had \$150 in gift certificates to use at a record store. She bought fewer than 20 recordings. Each tape cost \$5.95 and each CD cost \$8.95. How many of each type of recording might she have bought?

