

Graphing Systems of Inequalities

(Pages 586–590)

You can solve **systems of inequalities** by graphing. Recall that the graph of an inequality is a *half-plane*. The intersection of the two half-planes graphed in a system of inequalities represents the solution to the system.

EXAMPLE

Graph the system of inequalities to find the solution.

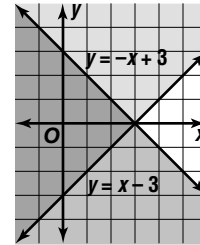
$$x + y \leq 3 \text{ and } y + 3 \geq x$$

Begin by solving each inequality for y . Then, graph each inequality.

$$\begin{array}{l} x + y \leq 3 \\ y \leq -x + 3 \end{array} \quad \text{and} \quad \begin{array}{l} y + 3 \geq x \\ y \geq x - 3 \end{array}$$

The solution to the system includes the ordered pairs in the intersection of the graphs of each inequality. This region is shaded dark gray.

Notice that the boundary lines $y = -x + 3$ and $y = x - 3$ are included in the solution, since the inequalities contained \leq and \geq symbols.



Try These Together

Solve each system of inequalities by graphing. If the system does not have a solution, write no solution.

1. $x > 3$
 $y \leq 5$

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

3. $y - 3 > x$
 $y + x < 3$

4. $2y + x < 6$
 $3x - y > 4$

HINT: Remember to graph inequalities with $<$ or $>$ with dashed lines because these lines are not included in the solution.

PRACTICE

Solve each system of inequalities by graphing. If the system does not have a solution, write no solution.

5. $x < 1$
 $y > -4$

6. $2x + y \leq 4$
 $3x - y \geq 6$

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

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

9. **Money** Carlita has some nickels and dimes in her pocket. She has at most 10 coins and they are worth at most 90 cents total. What combination of coins could she have?



10. **Standardized Test Practice** A dieter limits a snack to 90 Calories. Which is a possible snack combination of 20-Calorie apricots and 3-Calorie celery stalks?

A 4 apricots
3 celery stalks

B 3 apricots
10 celery stalks

C 2 apricots
8 celery stalks

D all of these

Answers: 1–8. See Answer Key. 9. Sample answer: 5 nickels, 5 dimes. 10. D