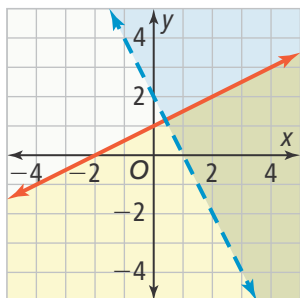**UNDERSTAND**

10. Look for Relationships How does a real-world situation that is best described by a system of linear inequalities differ from a real-world situation that is best described by a single linear inequality?

11. Error Analysis Describe and correct the error a student made in writing the system of inequalities represented by the graph shown below.

The red boundary line is $y = 0.5x + 1$.
Since the line is solid, use $\leq$ or $\geq$.
The blue boundary line is $y = -2x + 2$.
Since the line is dashed, use $<$ or $>$.

$y \leq 0.5x + 1$
$y < -2x + 2$ ✗

12. Mathematical Connections How is a system of two linear inequalities in two variables similar to a system of two linear equations in two variables? How is it different?

13. Reason In Example 3, the inequality made sense only in the first quadrant. What two inequalities could you add to the system to indicate this? Explain.

14. Higher Order Thinking Can you write a system of three inequalities that has no solutions? Explain.

15. Reason Could the solutions of a system of inequalities be a rectangular region? If so, give an example.

PRACTICE

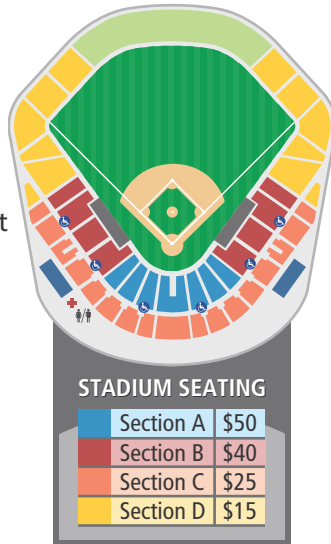**Graph each system of inequalities.**
SEE EXAMPLES 1 AND 3

16. $y < 2x + 1$
    $y \leq -x - 4$

17. $y \leq 3x - 2$
    $y > x - 2$

18. $y \geq -\frac{1}{2}x + 1$
    $y > x + 3$

19. $y < \frac{1}{3}x$
    $y \geq -4x + 1$

20. $2x + 3y < 5$
    $y \geq 2x - 3$

21. $x + 4y > 3$
    $x - y \leq 2$

22. $y > 0.3x + 2$
    $y < -0.2x + 1$

23. $y \leq 0.25x - 4$
    $y \geq -x - 3$

24. $y < -2x - 5$
    $4x - y < 3$

25. $-6x + 4y \geq 8$
    $y < -x - 1$

26. $x > 1$
    $y < 2x - 3$
    $y > x$

27. $y \leq -3x$
    $y > -x - 2$
    $y > 2$

What system of inequalities is shown by each graph? SEE EXAMPLES 2 AND 3

28.

29.

30.

31.

PRACTICE & PROBLEM SOLVING

APPLY

32. Make Sense and Persevere A group of at most 10 people wants to purchase a combination of seats in Section A and Section B, but does not want to spend more than $450. Graph the system of inequalities that represents the possible ticket combinations they could buy. List three possible combinations they could buy.

STADIUM SEATING

Section A	$50
Section B	$40
Section C	$25
Section D	$15

33. Model With Mathematics Kendra earns $10 per hour babysitting and $15 per hour providing tech support. Her goal is to save at least $1,000 by the end of the month while not working more than 80 hours. Write and graph a system of inequalities that shows how many hours Kendra could work at each job to meet her goal. What is the fewest number of hours she could work and still meet her goal?

34. Make Sense and Persevere Alex knits hats and scarves to sell at an art fair. He can make at most 20 hats and 30 scarves, but no more than 40 items altogether, in time for the art fair. Write and graph a system of inequalities that shows the possible numbers of hats and scarves Alex can bring to the art fair if he wants to bring at least 25 items. How do the solutions change if he wants to make more hats than scarves? Explain.
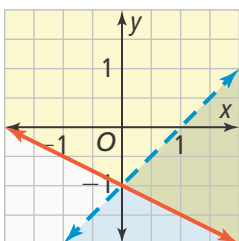
35. Construct Arguments Shannon and Dyani graph the following system of inequalities.
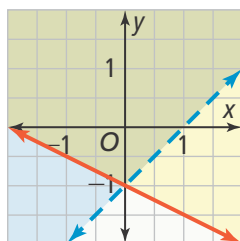
$$y \geq \frac{1}{2}x - 1$$
$$x - y > 1$$
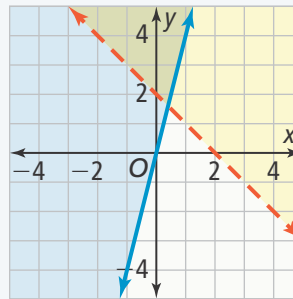
Which graph is correct? Explain.

Shannon's graph   **Dyani's graph**

ASSESSMENT PRACTICE

Use the graph to answer Exercises 36 and 37.

36. Fill in the blanks to complete the system of inequalities shown by the graph.
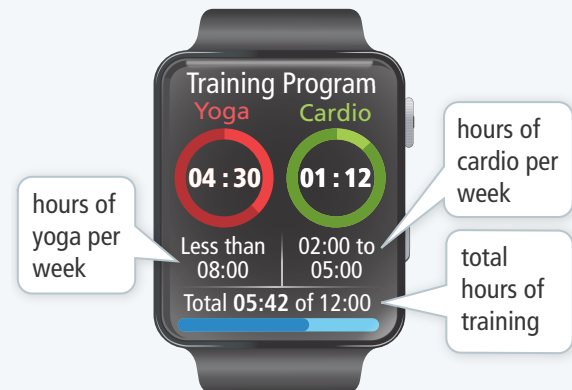
y ___ $-x +$ ___
y ___ $4x$

37. SAT/ACT Which of the following is a solution of the system of inequalities shown in the graph?

Ⓐ (3, 2)   Ⓒ (−1, 4)

Ⓑ (−3, 2)   Ⓓ (1, −4)

38. Performance Task A person is planning a weekly workout schedule of cardio and yoga. He has at most 12 hours per week to work out. The amounts of time he wants to spend on cardio and yoga are shown.

Training Program
Yoga   Cardio
04:30   01:12

hours of yoga per week
hours of cardio per week

Less than 08:00   02:00 to 05:00
Total **05:42** of 12:00
total hours of training

Part A Write a system of linear inequalities to represent this situation.

Part B Graph the system of inequalities. Is there a minimum number of hours the person will be doing cardio? Explain.