GUIDED PRACTICE

Vocabulary Check ✓

1. Give one example each of a quadratic inequality in one variable and a quadratic inequality in two variables.

Concept Check ✓

2. How does the graph of $y > x^2$ differ from the graph of $y \geq x^2$?

3. Explain how to solve $x^2 - 3x - 4 > 0$ graphically and algebraically.

Skill Check ✓

Graph the inequality.

4. $y \geq x^2 + 2$

5. $y \leq -2x^2$

6. $y < x^2 - 5x + 4$

Graph the system of inequalities.

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

8. $y \geq -x^2 + 3$
   $y \geq x^2 + 2x - 4$

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

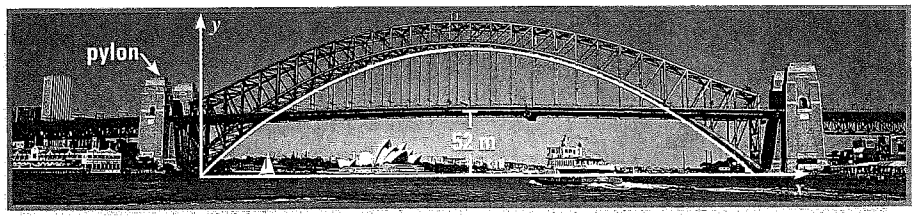
Solve the inequality.

10. $x^2 - 4 < 0$

11. $x^2 - 4 \geq 0$

12. $x^2 - 4 > 3x$

13. **ARCHITECTURE** The arch of the Sydney Harbor Bridge in Sydney, Australia, can be modeled by $y = -0.00211x^2 + 1.06x$ where x is the distance (in meters) from the left pylons and y is the height (in meters) of the arch above the water. For what distances x is the arch above the road?



PRACTICE AND APPLICATIONS

STUDENT HELP

Extra Practice to help you master skills is on p. 947.

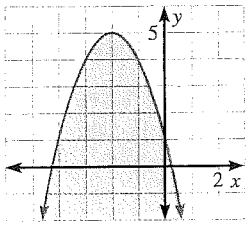
MATCHING GRAPHS **Match the inequality with its graph.**

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

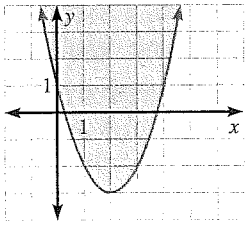
15. $y < x^2 - 4x + 1$

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

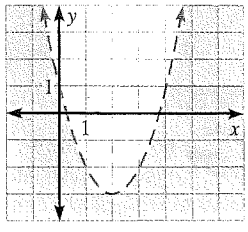
A.



B.



C.



STUDENT HELP

HOMEWORK HELP

Example 1: Exs. 14–28
Example 2: Exs. 47–49
Example 3: Exs. 29–34, 49
Examples 4, 5: Exs. 35–40
Example 6: Exs. 41–46
Example 7: Exs. 50, 51

GRAPHING QUADRATIC INEQUALITIES **Graph the inequality.**

17. $y \geq 3x^2$

18. $y \leq -x^2$

19. $y > -x^2 + 5$

20. $y < x^2 - 3x$

21. $y \leq x^2 + 8x + 16$

22. $y \leq -x^2 + x + 6$

23. $y \geq 2x^2 - 2x - 5$

24. $y \geq -2x^2 - x + 3$

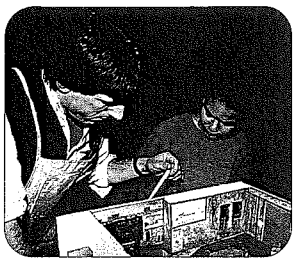
25. $y > -3x^2 + 5x - 4$

26. $y < -\frac{1}{2}x^2 - 2x + 4$

27. $y > \frac{4}{3}x^2 - 12x + 29$

28. $y < 0.6x^2 + 3x + 2.4$

FOCUS ON CAREERS



REAL LIFE SET DESIGNER
A set designer creates the scenery, or *sets*, used in a theater production. The designer may make scale models of the sets before they are actually built.

INTERNET CAREER LINK
www.mcdougallittell.com

GRAPHING SYSTEMS **Graph the system of inequalities.**

29. $y \geq x^2$
$y \leq x^2 + 3$

30. $y < -3x^2$
$y \geq -\frac{1}{2}x^2 - 5$

31. $y > x^2 - 6x + 9$
$y < -x^2 + 6x - 3$

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

33. $y < 3x^2 + 2x - 5$
$y \geq -2x^2 + 1$

34. $y \leq 2x^2 - 9x + 8$
$y > -x^2 - 6x - 4$

SOLVING BY GRAPHING **Solve the inequality by graphing.**

35. $x^2 + x - 2 < 0$

36. $2x^2 - 7x + 3 \geq 0$

37. $-x^2 - 2x + 8 \leq 0$

38. $-x^2 + x + 5 > 0$

39. $3x^2 + 24x \geq -41$

40. $-\frac{3}{4}x^2 + 4x - 8 < 0$

SOLVING ALGEBRAICALLY **Solve the inequality algebraically.**

41. $x^2 + 3x - 18 \geq 0$

42. $3x^2 - 16x + 5 \leq 0$

43. $4x^2 < 25$

44. $-x^2 - 12x < 32$

45. $2x^2 - 4x - 5 > 0$

46. $\frac{1}{2}x^2 + 3x \leq -6$

THEATER **In Exercises 47 and 48, use the following information.**
You are a member of a theater production crew. You use manila rope and wire rope to support lighting, scaffolding, and other equipment. The weight W (in pounds) that can be safely supported by a rope with diameter d (in inches) is given below for both types of rope. ▶ Source: *Workshop Math*

Manila rope: $W \leq 1480d^2$ **Wire rope:** $W \leq 8000d^2$

47. Graph the inequalities in separate coordinate planes for $0 \leq d \leq 1\frac{1}{2}$.

48. Based on your graphs, can 1000 pounds of theater equipment be supported by a $\frac{1}{2}$ inch manila rope? by a $\frac{1}{2}$ inch wire rope?

49. **HEALTH** For a person of height h (in inches), a healthy weight W (in pounds) is one that satisfies this system of inequalities:

$$W \geq \frac{19h^2}{703} \quad \text{and} \quad W \leq \frac{25h^2}{703}$$

Graph the system for $0 \leq h \leq 80$. What is the range of healthy weights for a person 67 inches tall? ▶ Source: *Parade Magazine*

SOLVING INEQUALITIES **In Exercises 50–52, you may want to use a graphing calculator to help you solve the problems.**

STUDENT HELP

INTERNET HOMEWORK HELP
Visit our Web site www.mcdougallittell.com for help with problem solving in Exs. 50–52.

50. **FORESTRY** *Sawtimber* is a term for trees that are suitable for sawing into lumber, plywood, and other products. For the years 1983–1995, the unit value y (in 1994 dollars per million board feet) of one type of sawtimber harvested in California can be modeled by

$$y = 0.125x^2 - 569x + 848{,}000, \quad 400 \leq x \leq 2200$$

where x is the volume of timber harvested (in millions of board feet).
▶ Source: California Department of Forestry and Fire Protection

a. For what harvested timber volumes is the value of the timber at least \$400,000 per million board feet?

b. **LOGICAL REASONING** What happens to the unit value of the timber as the volume harvested increases? Why would you expect this to happen?