



## 158 CHAPTER 3 Linear and Quadratic Functions

## 3.5 Assess Your Understanding

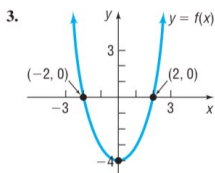
**'Are You Prepared?'** Answers are given at the end of these exercises. If you get a wrong answer, read the pages listed in red.

1. Solve the inequality  $-3x - 2 < 7$ . (pp. A75–A78)

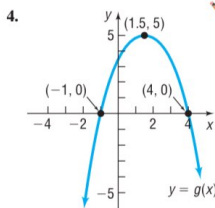
2. Write the interval  $(-2, 7]$  using inequality notation. (pp. A72–A73)

## Skill Building

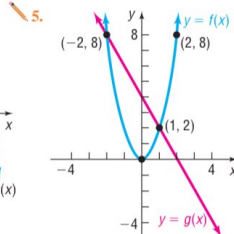
In Problems 3–6, use the figure to solve each inequality.



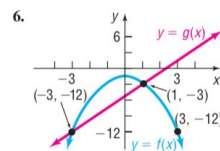
(a)  $f(x) > 0$   
 (b)  $f(x) \leq 0$



(a)  $g(x) < 0$   
 (b)  $g(x) \geq 0$



(a)  $g(x) \geq f(x)$   
 (b)  $f(x) > g(x)$



(a)  $f(x) < g(x)$   
 (b)  $f(x) \geq g(x)$

In Problems 7–22, solve each inequality.

7.  $x^2 - 3x - 10 < 0$

8.  $x^2 + 3x - 10 > 0$

11.  $x^2 - 9 < 0$

12.  $x^2 - 1 < 0$

15.  $2x^2 < 5x + 3$

16.  $6x^2 < 6 + 5x$

19.  $4x^2 + 9 < 6x$

20.  $25x^2 + 16 < 40x$

9.  $x^2 - 4x > 0$

13.  $x^2 + x > 12$

17.  $x^2 - x + 1 \leq 0$

21.  $6(x^2 - 1) > 5x$

10.  $x^2 + 8x > 0$

14.  $x^2 + 7x < -12$

18.  $x^2 + 2x + 4 > 0$

22.  $2(2x^2 - 3x) > -9$

## Mixed Practice

23. What is the domain of the function  $f(x) = \sqrt{x^2 - 16}$ ?

24. What is the domain of the function  $f(x) = \sqrt{x - 3x^2}$ ?

In Problems 25–32, use the given functions  $f$  and  $g$ .

(a) Solve  $f(x) = 0$ .

(b) Solve  $g(x) = 0$ .

(c) Solve  $f(x) = g(x)$ .

(d) Solve  $f(x) > 0$ .

(e) Solve  $g(x) \leq 0$ .

(f) Solve  $f(x) > g(x)$ .

(g) Solve  $f(x) \geq 1$ .

25.  $f(x) = x^2 - 1$

26.  $f(x) = -x^2 + 3$

27.  $f(x) = -x^2 + 1$

28.  $f(x) = -x^2 + 4$

$g(x) = 3x + 3$

$g(x) = -3x + 3$

$g(x) = 4x + 1$

$g(x) = -x - 2$

29.  $f(x) = x^2 - 4$

30.  $f(x) = x^2 - 2x + 1$

31.  $f(x) = x^2 - x - 2$

32.  $f(x) = -x^2 - x + 1$

$g(x) = -x^2 + 4$

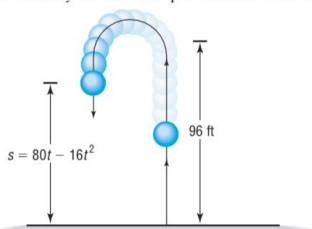
$g(x) = -x^2 + 1$

$g(x) = x^2 + x - 2$

$g(x) = -x^2 + x + 6$

## Applications and Extensions

- 33.
- Physics**
- A ball is thrown vertically upward with an initial velocity of 80 feet per second. The distance
- $s$

(in feet) of the ball from the ground after  $t$  seconds is  $s(t) = 80t - 16t^2$ .

(a) At what time  $t$  will the ball strike the ground?

(b) For what time  $t$  is the ball more than 96 feet above the ground?

- 34.
- Physics**
- A ball is thrown vertically upward with an initial velocity of 96 feet per second. The distance
- $s$
- (in feet) of the ball from the ground after
- $t$
- seconds is
- $s(t) = 96t - 16t^2$
- .

(a) At what time  $t$  will the ball strike the ground?

(b) For what time  $t$  is the ball more than 128 feet above the ground?

- 35.
- Revenue**
- Suppose that the manufacturer of a gas clothes dryer has found that, when the unit price is
- $p$
- dollars, the revenue
- $R$
- (in dollars) is

$$R(p) = -4p^2 + 4000p$$