

**9-4**  
EXERCISES

**Chapter 9**  
Quadratic Functions and Equations

Homework Help Online

Online Support for Lesson 9-4 Homework

**GUIDED PRACTICE**

Click a video icon to see a Lesson Tutorial Video. Click a pencil icon to practice similar problems.



VIDEO

**See Example 1**

Order the functions from narrowest graph to widest.

1.  $f(x) = 3x^2, g(x) = 2x^2$

2.  $f(x) = 5x^2, g(x) = -5x^2$

3.  $f(x) = \frac{3}{4}x^2, g(x) = -2x^2,$   
 $h(x) = -8x^2$

4.  $f(x) = x^2, g(x) = -\frac{4}{5}x^2,$   
 $h(x) = 3x^2$



PRACTICE



VIDEO

**See Example 2**

Compare the graph of each function with the graph of  $f(x) = x^2$ .

5.  $g(x) = x^2 + 6$

6.  $g(x) = -2x^2 + 5$

7.  $g(x) = \frac{1}{3}x^2$

8.  $g(x) = -\frac{1}{4}x^2 - 2$



PRACTICE



VIDEO

See Example 3

9. **Multi-Step** Two baseballs are dropped, one from a height of 16 feet and the other from a height of 256 feet.

- Write the two height functions and compare their graphs.
- Use the graphs to tell when each baseball reaches the ground.



PRACTICE

**PRACTICE AND PROBLEM SOLVING**

Click a video icon to see a Lesson Tutorial Video. Click a lightbulb icon to see a complete solution.



VIDEO

Order the functions from narrowest graph to widest.

10.  $f(x) = x^2, g(x) = 4x^2$

11.  $f(x) = -2x^2, g(x) = \frac{1}{2}x^2$

12.  $f(x) = -x^2, g(x) = -\frac{5}{8}x^2, h(x) = \frac{1}{2}x^2$

13.  $f(x) = -5x^2, g(x) = -\frac{3}{8}x^2, h(x) = 3x^2$



VIDEO

Compare the graph of each function with the graph of  $f(x) = x^2$ .

14.  $g(x) = \frac{1}{2}x^2 - 10$

15.  $g(x) = -4x^2 - 2$

16.  $g(x) = \frac{2}{3}x^2 - 9$

17.  $g(x) = -\frac{1}{5}x^2 + 1$



VIDEO

18. **Multi-Step** A raindrop falls from a cloud at an altitude of 10,000 ft. Another raindrop falls from a cloud at an altitude of 14,400 ft.

- Write the two height functions and compare their graphs.
- Use the graphs to tell when each raindrop reaches the ground.



SOLUTION

Tell whether each statement is sometimes, always, or never true.

19. The graphs of  $f(x) = ax^2$  and  $g(x) = -ax^2$  have the same width.



SOLUTION

21. The graph of  $y = ax^2 + 1$  has its vertex at the origin.



SOLUTION

**Write a function to describe each of the following.**

25. The graph of  $f(x) = 3x^2 - 2$  is translated 4 units down.