

## 2.1 Practice A

In Exercises 1–6, describe the transformation of  $f(x) = x^2$  represented by  $g$ .

Then graph each function.

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

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

3.  $g(x) = (x + 1)^2$

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

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

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

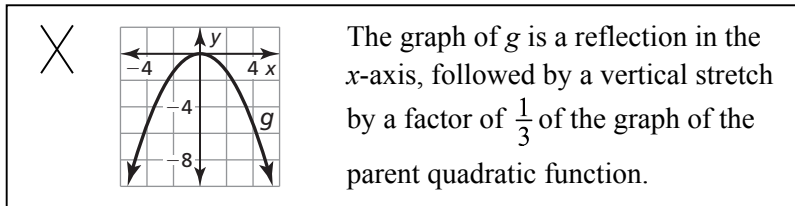
In Exercises 7–9, describe the transformation of  $f(x) = x^2$  represented by  $g$ . Then graph each function.

7.  $g(x) = -2x^2$

8.  $g(x) = (-2x)^2$

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

10. Describe and correct the error in analyzing the graph of  $f(x) = -\frac{1}{3}x^2$ .



In Exercises 11 and 12, describe the transformation of the graph of the parent quadratic function. Then identify the vertex.

11.  $f(x) = 2(x + 3)^2 + 2$

12.  $f(x) = -5x^2 - 1$

In Exercises 13 and 14, write a rule for  $g$  described by the transformations of the graph of  $f$ . Then identify the vertex.

13.  $f(x) = x^2$ ; vertical stretch by a factor of 3 and a reflection in the  $x$ -axis, followed by a translation 3 units down

14.  $f(x) = 4x^2 + 5$ ; horizontal stretch by a factor of 2 and a translation 2 units up, followed by a reflection in the  $x$ -axis

15. Let the graph of  $g$  be a translation 4 units down and 3 units right, followed by a horizontal shrink by a factor of  $\frac{1}{2}$  of the graph of  $f(x) = x^2$ .

a. Identify the values of  $a$ ,  $h$ , and  $k$ . Write the transformed function in vertex form.

b. Suppose the horizontal shrink was performed first, followed by the translations. Identify the values of  $a$ ,  $h$ , and  $k$ , and write the transformed function in vertex form.