

ACTIVITY 8 PRACTICE

Write your answers on notebook paper.

Show your work.

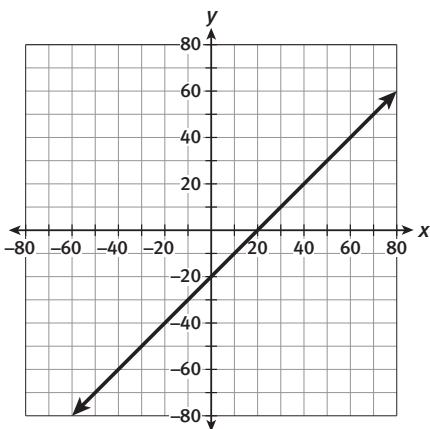
Lesson 8-1

In Items 1–4, identify the transformation from the graph of $f(x) = x^3$ to the graph of $g(x)$.

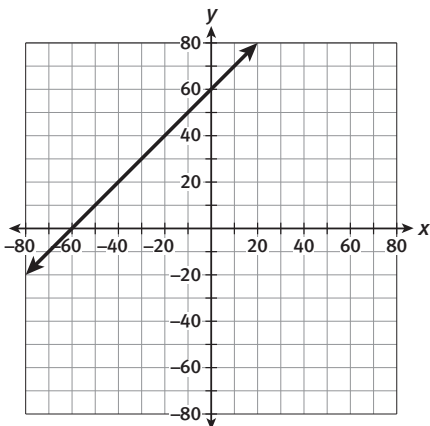
1. $g(x) = x^3 + 11$
2. $g(x) = x^3 - 4$
3. $g(x) = x^3 + 0.1$
4. $g(x) = -2 + x^3$
5. The graph of $f(x) = x^2$ is translated 9 units down to create the graph of $g(x)$. Which of the following is the equation for $g(x)$?
 - A. $g(x) = x^2 + 9$
 - B. $g(x) = x^2 - 9$
 - C. $g(x) = (x + 9)^2$
 - D. $g(x) = (x - 9)^2$

In Items 6 and 7, each graph shows a vertical translation of the graph of $f(x) = x$. Write an equation to describe the graph. Identify the zeros of each function.

6.



7.



For Items 8 and 9, determine the equation of the function described by each of the following transformations of the graph of $f(x) = 3^x$.

8. Translated 15 units down
9. Translated 2.1 units up
10. An air conditioner costs \$450 plus \$40 per month to operate.
 - a. Write a function that describes the total cost of buying and operating the air conditioner for x months.
 - b. Use your calculator to graph the function.
 - c. What is the y -intercept? What does it represent?
 - d. How would the function change if the price of the air conditioner were reduced to \$425? How would the graph change?

Given that $g(x) = f(x) + k$, with $k \neq 0$, determine whether each statement is always, sometimes, or never true.

11. The graph of $g(x)$ is a vertical translation of the graph of $f(x)$.
12. The graphs of $f(x)$ and $g(x)$ are both lines.
13. The graph of $f(x)$ has the same y -intercept as the graph of $g(x)$.
14. Caitlin drew the graph of $f(x) = x^2$. Then she translated the graph 6 units up to get the graph of $g(x)$. Next, she translated the graph of $g(x)$ 8 units down to get the graph of $h(x)$. Which of these is an equation for $h(x)$?
 - A. $h(x) = x^2 + 14$
 - B. $h(x) = x^2 + 2$
 - C. $h(x) = x^2 - 2$
 - D. $h(x) = x^2 - 14$

ACTIVITY 8

continued

Transformations of Functions

Transformers

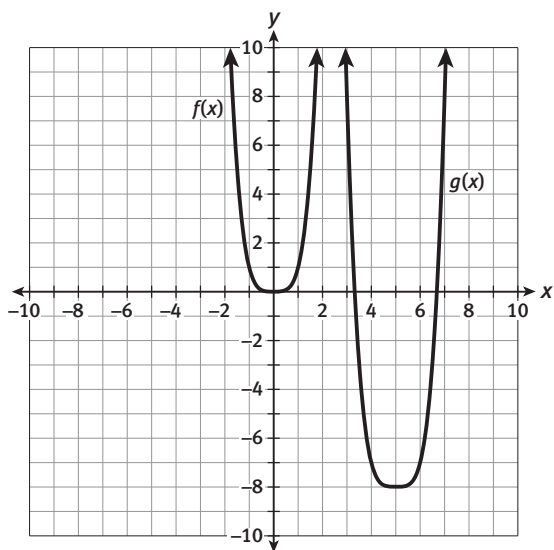
Lesson 8-2

In Items 15–18, identify the transformation from the graph of $f(x) = 2^x$ to the graph of $g(x)$.

15. $g(x) = 2^x - 3$
16. $g(x) = 2^{(x-3)}$
17. $g(x) = 2^x + 4$
18. $g(x) = 2^{(x+4)}$
19. The graph of which function is a translation of the graph of $f(x) = x^2$ five units to the right?
 - A. $g(x) = x^2 - 5$
 - B. $g(x) = (x + 5)^2$
 - C. $g(x) = (x - 5)^2$
 - D. $g(x) = x^2 + 5$

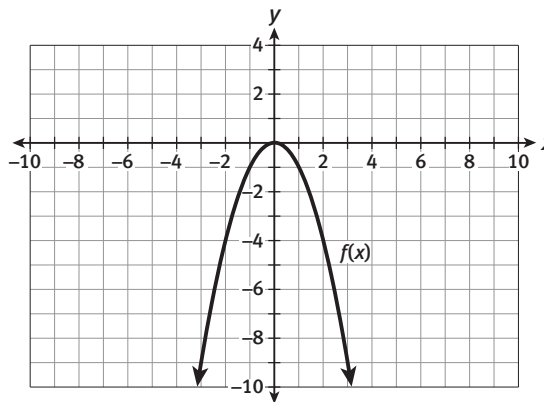
Write the equation of the function described by each of the following transformations of the graph of $f(x) = x^3$.

20. Translated 7 units up
21. Translated 4 units down
22. Translated 2 units right
23. Translated 5 units down
24. Translated 3 units left
25. The figure shows the graph of $f(x) = x^4$ and the graph of $g(x)$. Write an equation for the graph of $g(x)$.



Without graphing, describe the transformation from the graph of $f(x) = x^2$ to the graph of $g(x)$.

26. $g(x) = (x - 7)^2 + 1$
27. $g(x) = f(x + 4)$
28. $g(x) = (x + 9)^2 - 0.2$
29. $g(x) = f(x - 2) - 3$
30. The graph of $f(x)$ is shown below. Which of the following is a true statement about the graph of $g(x) = f(x + 3)$?
 - A. The x -intercept of $g(x)$ is $(3, 0)$.
 - B. The x -intercept of $g(x)$ is $(-3, 0)$.
 - C. The y -intercept of $g(x)$ is $(0, 3)$.
 - D. The y -intercept of $g(x)$ is $(0, -3)$.



MATHEMATICAL PRACTICES

Model with Mathematics

31. In 2011, the ticket price for entrance to a state fair was \$12. Each ride had an additional \$4.00 fee. In 2012, the entrance ticket cost \$15 and the rides remained \$4.00 each.
 - a. Write a function $f(x)$ for the cost of visiting the fair and riding x rides in 2011.
 - b. Write a function $g(x)$ for the cost of visiting the fair and riding x rides in 2012.
 - c. What transformation could you use to obtain the graph of $g(x)$ from the graph of $f(x)$?
 - d. What transformation could you use to obtain the graph of $f(x)$ from the graph of $g(x)$?