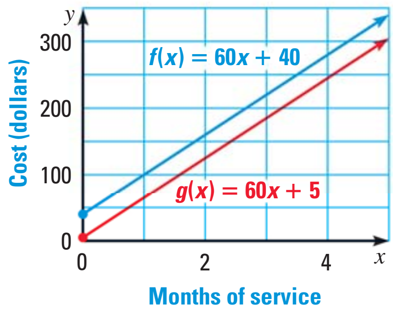
EXAMPLE 5 Graph real-world functions

CABLE A cable company charges new customers \$40 for installation and \$60 per month for its service. The cost to the customer is given by the function $f(x) = 60x + 40$ where x is the number of months of service. To attract new customers, the cable company reduces the installation fee to \$5. A function for the cost with the reduced installation fee is $g(x) = 60x + 5$. Graph both functions. How is the graph of g related to the graph of f?

Solution

The graphs of both functions are shown. Both functions have a slope of 60, so they are parallel. The y-intercept of the graph of g is 35 less than the graph of f. So, the graph of g is a vertical translation of the graph of f.



REVIEW TRANSFORMATIONS

For help with transformations, see pp. 922–923.

✓ GUIDED PRACTICE for Example 5

4. **WHAT IF?** In Example 5, suppose the monthly fee is \$70 so that the cost to the customer is given by $h(x) = 70x + 40$. Graph f and h in the same coordinate plane. How is the graph of h related to the graph of f?

4.7 EXERCISES

HOMEWORK KEY

○ = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 3, 17, and 39

★ = **TAKS PRACTICE AND REASONING** Exs. 13, 22, 35, 36, 44, 45, 46, and 47

SKILL PRACTICE

1. **VOCABULARY** When you write the function $y = 3x + 12$ as $f(x) = 3x + 12$, you are using __?__.

2. **WRITING** Would the functions $f(x) = -9x + 12$, $g(x) = -9x - 2$, and $h(x) = -9x$ be considered a family of functions? *Explain.*

EXAMPLE 1 on p. 262 for Exs. 3–13

EVALUATING FUNCTIONS **Evaluate the function when $x = -2$, 0, and 3.**

3. $f(x) = 12x + 1$
4. $g(x) = -3x + 5$
5. $p(x) = -8x - 2$
6. $h(x) = 2.25x$
7. $m(x) = -6.5x$
8. $f(x) = -0.75x - 1$
9. $s(x) = \frac{2}{5}x + 3$
10. $d(x) = -\frac{3}{2}x + 5$
11. $h(x) = \frac{3}{4}x - 6$

12. **ERROR ANALYSIS** *Describe* and correct the error in evaluating the function $g(x) = -5x + 3$ when $x = -3$.

$$g(-3) = -5(-3) + 3$$
$$-3g = 18$$
$$g = -6$$