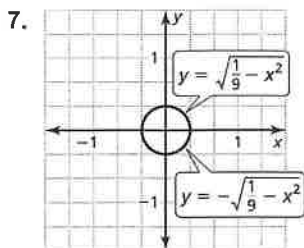


# Answers



The radius is  $\frac{1}{3}$  unit. The  $x$ -intercepts are  $\pm\frac{1}{3}$ . The  $y$ -intercepts are  $\pm\frac{1}{3}$ .

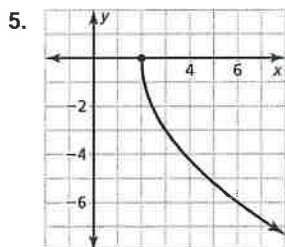
8. Sample answer:  $g(x) = 2\sqrt{x+1} - 3$ ,  
 $h(x) = -2\sqrt{-x} - 1$

## 5.3 Review & Refresh

1.  $x < -7$  or  $x > -5$     2.  $\frac{2a^{1/2}c^{1/5}}{b}$

3. 3;  $y = -\frac{1}{2}x^3 + 4x^2 - \frac{3}{2}x - 7$

4. 2.41



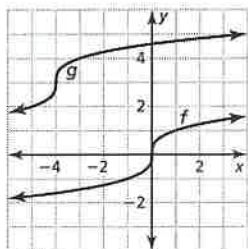
The domain is  $x \geq 2$ . The range is  $y \leq 0$ .

6.  $x = \frac{7}{3}$

7.  $y = \begin{cases} -2x - 1, & \text{if } x < 1 \\ -x + 3, & \text{if } x \geq 1 \end{cases}$

8. decrease by \$15; decrease by 10%

9. The graph of  $g$  is a translation 4 units left and 3 units up of the graph of  $f$ .



## 5.4 Extra Practice

- $x = -48$
- $x = -13$
- $x = 32,768$
- no real solution
- about 1.82 ft
- $x = 2$
- $x = -1$  and  $x = 15$
- $x = -1$
- $x = -6$
- $x = 4$
- $x = -\frac{1}{3}$
- $1 \leq x \leq 2$
- $x < 322.5$
- $0 \leq x \leq 65\frac{1}{3}$
- 1.76 ft

## 5.4 Review & Refresh

1.  $x^4 + 8x^3 - 7x$     2.  $x^4 - 3x^3 + 5$

3.  $g(x) = \sqrt{x+1} + 3$

4.  $x = -10$  and  $x = -2$ ; The point  $(-10, 4)$  is located 4 units to the left of the axis of symmetry, so the second solution is located 4 units to the right of the axis of symmetry at the point  $(-2, 4)$ .

5.  $g(x) = -x^3 + 3x^2 - 6$ ; The graph of  $g$  is a reflection in the  $y$ -axis and a translation 2 units down of the graph of  $f$ .

6.  $g(x) = \frac{1}{8}x^3 + \frac{3}{4}x^2 + 2$ ; The graph of  $g$  is a horizontal stretch by a factor of 2 and a translation 6 units up of the graph of  $f$ .

7.  $-2 \leq x < 14$     8.  $x \geq 125$

9.  $x \geq -8$     10.  $3 \leq x < 7$

11.  $523 \text{ m}^3$     12.  $x = \frac{7}{2}$  and  $x = -1$

13.  $(1, 2, -3)$ ; Explanations will vary.

## 5.5 Extra Practice

- $(f + g)(x) = 4\sqrt[3]{x}$  and the domain is all real numbers;  $(f - g)(x) = -5\sqrt[3]{x}$  and the domain is all real numbers;  $(f + g)(-1000) = -40$ ;  
 $(f - g)(-1000) = 50$

# Answers

2.  $(f + g)(x) = -4x^2 + 3x + 8$  and the domain is all real numbers;  $(f - g)(x) = 2x^2 - 9x + 8$  and the domain is all real numbers;  $(f + g)(-1) = 1$ ;  $(f - g)(-1) = 19$
3.  $(f + g)(x) = x^3 + 2x^2 + 21$  and the domain is all real numbers;  $(f - g)(x) = 7x^3 - 2x^2 + 3$  and the domain is all real numbers;  $(f + g)(2) = 37$ ;  $(f - g)(2) = 51$
4.  $(f + g)(x) = 2\sqrt[4]{x} - 1$  and the domain is  $x \geq 0$ ;  $(f - g)(x) = 8\sqrt[4]{x} + 3$  and the domain is  $x \geq 0$ ;  $(f + g)(1) = 1$ ;  $(f - g)(1) = 11$
5.  $(fg)(x) = -2x^{10/3}$  and the domain is all real numbers;  $\left(\frac{f}{g}\right)(x) = -\frac{1}{2}x^{8/3}$  and the domain is  $x \neq 0$ ;  $(fg)(-64) = -2,097,152$ ;  
 $\left(\frac{f}{g}\right)(-64) = -32,768$
6.  $(fg)(x) = 132x^{3/2}$  and the domain is  $x \geq 0$ ;  
 $\left(\frac{f}{g}\right)(x) = \frac{12}{11}x^{1/2}$  and the domain is  $x > 0$ ;  
 $(fg)(4) = 1056$ ;  $\left(\frac{f}{g}\right)(4) = \frac{24}{11}$
7.  $(fg)(x) = -x^{11/6}$  and the domain is  $x \geq 0$ ;  
 $\left(\frac{f}{g}\right)(x) = -\frac{1}{16x^{7/6}}$  and the domain is  $x > 0$ ;  
 $(fg)(1) = -1$ ;  $\left(\frac{f}{g}\right)(1) = -\frac{1}{16}$
8.  $(fg)(x) = 144x^{9/4}$  and the domain is  $x \geq 0$ ;  
 $\left(\frac{f}{g}\right)(x) = 9x^{5/4}$  and the domain is  $x > 0$ ;  
 $(fg)(16) = 73,728$ ;  $\left(\frac{f}{g}\right)(16) = 288$
9. a.  $(A - B)(t) = \frac{1}{2}t^{2/3}$   
b. the difference in the amount of mold in the two specimens
10.  $f(-3) = 18$  and  $g(-3) = -24$

## 5.5 Review & Refresh

1.  $x = 6$                       2.  $x = 2$
3.  $n = \frac{5}{12a - 3}$
4. yes; Every input has exactly one output.
5.  $(fg)(x) = 18x^{14/3}$  and the domain is all real numbers;  $\left(\frac{f}{g}\right)(x) = 2x^{10/3}$  and the domain is all real numbers;  $(fg)(8) = 294,912$ ;  
 $\left(\frac{f}{g}\right)(8) = 2048$
7. linear; As  $x$  decreases by 4,  $y$  increases by 1, so the differences are constant.
8. a. 2016  
b. \$22.74 billion; The net revenue of the online store increased by \$22.74 billion each year from 2010 to 2018.  
c. no; The model shows that the net revenue of the online store continues to increase for all future years, which is not likely.

## 5.6 Extra Practice

1. 10                      2. 3                      3. -3
4. 2                      5. 16.6                      6.  $\frac{617}{16}$
7. a.  $f(g(x)) = 2|x - 1| + 3$ ; all real numbers  
b.  $g(f(x)) = |2x + 2|$ ; all real numbers  
c.  $f(f(x)) = 4x + 9$ ; all real numbers
8. a.  $f(g(x)) = 48x^2 - 72x + 27$ ; all real numbers  
b.  $g(f(x)) = -12x^2 + 3$ ; all real numbers  
c.  $f(f(x)) = 27x^4$ ; all real numbers
9. a.  $f(g(x)) = \frac{6}{6x + 1}$ ; all real numbers except  
 $x = -\frac{1}{6}$   
b.  $g(f(x)) = \frac{36}{x} + 1$ ; all real numbers except  
 $x = 0$   
c.  $f(f(x)) = x$ ; all real numbers