

# Answers

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

## 5.5 Review & Refresh

- $x = 6$
- $x = 2$
- $n = \frac{5}{12a - 3}$
- yes; Every input has exactly one output.
- $(fg)(x) = 18x^{14/3}$  and the domain is all real numbers;  $\left(\frac{f}{g}\right)(x) = 2x^{10/3}$  and the domain is all real numbers;  $(fg)(8) = 294,912$ ;  
 $\left(\frac{f}{g}\right)(8) = 2048$
- linear; As  $x$  decreases by 4,  $y$  increases by 1, so the differences are constant.
- 2016
  - \$22.74 billion; The net revenue of the online store increased by \$22.74 billion each year from 2010 to 2018.
  - 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

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

# Answers

10. a.  $f(g(x)) = \frac{9}{x^2 - 4}$ ; all real numbers except  $x = -2$  and  $x = 2$

b.  $g(f(x)) = \frac{81}{x^2} - 4$ ; all real numbers except  $x = 0$

c.  $f(f(x)) = x$ ; all real numbers

11. a.  $f(g(x)) = -2\sqrt{x-9} + 5$ ;  $x \geq 9$

b.  $g(f(x)) = \sqrt{-2x-4}$ ;  $x \leq -2$

c.  $f(f(x)) = 4x - 5$ ; all real numbers

12. a.  $f(g(x)) = 6\sqrt[3]{x+7} + 3$ ; all real numbers

b.  $g(f(x)) = \sqrt[3]{6x+10}$ ; all real numbers

c.  $f(f(x)) = 36x + 21$ ; all real numbers

13. a.  $A(r(t)) = 9\pi t^2$

b.  $A(r(6)) \approx 1017.9$ ; After 6 seconds, the area of the oil spill is about 1017.9 square feet.

14.  $g(h(q(p(x)))) = g(h(q(x-3))) =$   
 $g(h(\sqrt[3]{x-3})) = g(\sqrt[3]{x-3} + 1) = 4(\sqrt[3]{x-3} + 1)$   
 $= 4\sqrt[3]{x-3} + 4$

## 5.6 Review & Refresh

1.  $0 \leq x \leq 1$

2.  $x > 724$

3. a. The function is increasing when  $x > -3$  and decreasing when  $x < -3$ .

b.  $x < -4$  and  $x > -2$

c.  $-4 < x < -2$

4.  $-3$

5. 14

6.  $g(x)\sqrt{2x} - 5$

7.  $(-1, 0)$  and  $(1, 4)$ ; Explanations will vary.

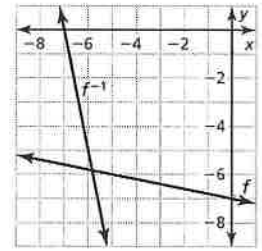
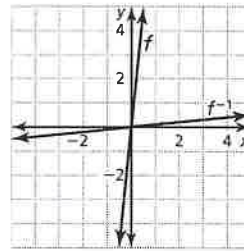
8.  $(P - F)(t) = 0.018t^3 - 0.317t + 1.6t + 196.9$ ;  
 The number of people in the United States who do not work full time.

9.  $84.8 \text{ in.}^3$

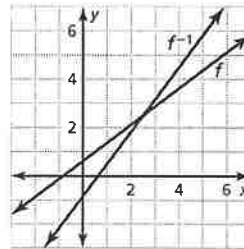
## 5.7 Extra Practice

1.  $f^{-1}(x) = \frac{1}{10}x$

2.  $f^{-1}(x) = -5x - 35$

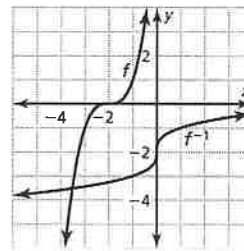


3.  $f^{-1}(x) = \frac{4}{3}x - \frac{5}{6}$

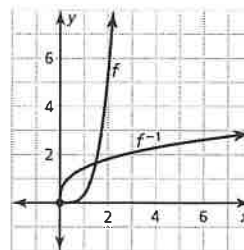


4. yes; The  $x$ - and  $y$ -coordinates are switched.

5.  $f^{-1}(x) = \sqrt[3]{x} - 2$



6.  $f^{-1}(x) = \sqrt[4]{3x}$



7. no

8. yes

9. a.  $h^{-1}(t) = \frac{\sqrt{100-10t}}{7}$ ; the time it takes the

object to be  $h$  meters above the ground

b. about 1.28 sec