Practice 7-4
1-45 EOO

1. 3 **2.** 81 **3.** 32 **4.** 256 **5.** 1 **6.** 4 **7.** -1 **8.** 9 **9.** 2

10. $x^{\frac{5}{6}}$ **11.** $2y^{\frac{3}{2}}$ **12.** 4 **13.** 1 **14.** $\frac{1}{2}$ **15.** $\frac{9}{4}$ **16.** 0

17. $12x^{\frac{7}{6}}$ **18.** $\frac{3}{y^{\frac{1}{6}}}$ **19.** $9ab^{\frac{2}{3}}$ **20.** $\frac{1}{y^6}$ **21.** $\frac{b^3}{a^4}$ **22.** $y^{\frac{31}{40}}$

23. $\frac{1}{x^{\frac{2}{21}}}$ **24.** $8a^{\frac{3}{4}}$ **25.** $\frac{1}{9}$ **26.** $12x^{\frac{13}{20}}$ **27.** $\frac{3x^2}{y}$

28. 10.1% **29.** $\sqrt[3]{x^4}$ **30.** $\sqrt[3]{2y}$ **31.** $\sqrt{a^3}$ **32.** $\sqrt[5]{b}$ **cont.**

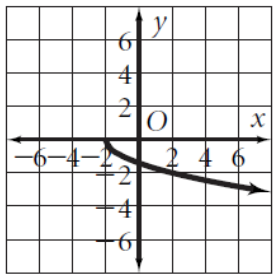
Practice 7-4
1-45 EOO

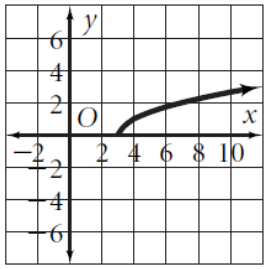
33. $\sqrt[3]{z^2}$ **34.** $\sqrt[4]{ab}$ **35.** $\sqrt[5]{m^{12}}$ **36.** $\frac{1}{\sqrt[7]{t^2}}$ **37.** $\frac{1}{\sqrt[5]{a^8}}$

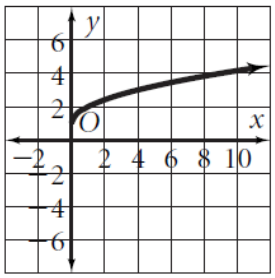
38. $x^{\frac{3}{2}}$ **39.** $m^{\frac{1}{3}}$ **40.** $(5y)^{\frac{1}{2}}$ **41.** $2^{\frac{1}{3}}y^{\frac{2}{3}}$ **42.** $b^{\frac{3}{4}}$ **43.** $(-6)^{\frac{1}{2}}$

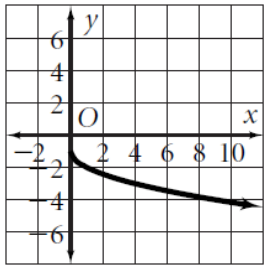
44. $36a^2$ **45.** $n^{\frac{4}{5}}$ **46.** $(5ab)^{\frac{3}{4}}$

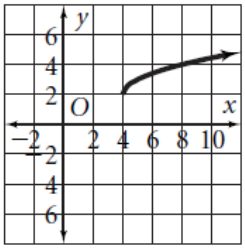
Practice 7-8
(1-10, 29-33)

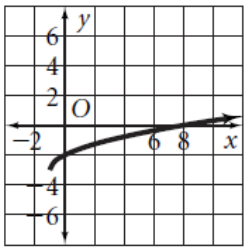
1. 

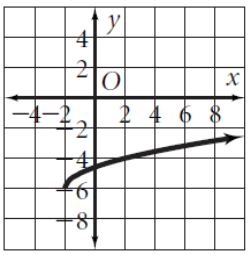
2. 

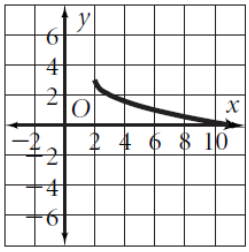
3. 

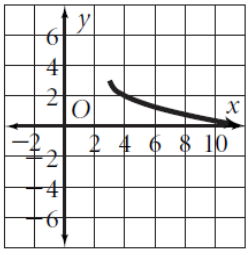
4. 

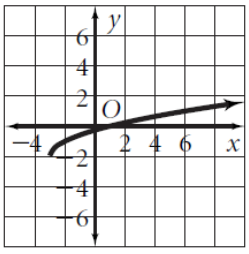
5. 

6. 

7. 

8. 

9. 

10. 

7.8 29-33 odd

29. $y = 9\sqrt{x + 2}$; graph of $y = 9\sqrt{x}$ shifted left 2 units

30. $y = -2\sqrt{x + 5}$; graph of $y = -2\sqrt{x}$ shifted left 5 units

31. $y = 5\sqrt[3]{x - 2}$; graph of $y = 5\sqrt[3]{x}$ shifted right 2 units

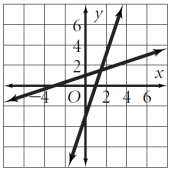
32. $y = -8\sqrt{x + 3}$; graph of $y = -8\sqrt{x}$ shifted left 3 units

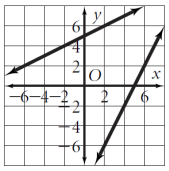
33. $y = -2\sqrt[3]{x - 7} + 4$; graph of $y = -2\sqrt[3]{x}$ shifted right 7 units and up 4 units

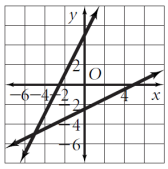
Practice 7-5

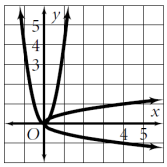
1. 127 **2.** $-8, 8$ **3.** 9 **4.** 3 **5.** no solution **6.** 25 **7.** 9
8. -14 **9.** 1 **10.** 27 **11.** $4, 2$ **12.** 9 **13.** 7 **14.** 2 **15.** 4
16. $29, -25$ **17.** 10 **18.** 16 **19.** 4 **20.** 13 **21.** 4 **30.** -2

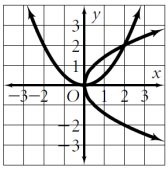
Practice 7-7 1-30

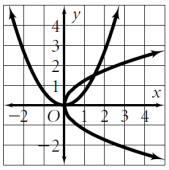
1. 

2. 

3. 

4. 

5. 

6. 

7. $y = \pm\sqrt{x - 2}$; no **8.** $y = x - 2$; yes

9. $y = \frac{1}{3}x - 1$; yes **10.** $y = \pm\sqrt{-x - 3}$; no

11. $y = \frac{1}{2}x + \frac{1}{2}$; yes **12.** $y = \pm\sqrt{\frac{1 - x}{3}}$; no

25.

x	-2	-1	0	1
y	-3	-2	-1	0

26.

x	0	1	2	3
y	-3	-1	0	-2

Let $f(x) = 2x + 5$. Find each value.

27. $(f^{-1} \circ f)(-1)$ **28.** $(f \circ f^{-1})(3)$ **29.** $(f \circ f^{-1})\left(-\frac{1}{2}\right)$

30. The equation $f(x) = 198{,}900x + 635{,}600$ can be used to model the number of utility trucks under 6000 pounds that are sold each year in the U.S. with $x = 0$ representing the year 1992. Find the inverse of the function. Use the inverse to estimate in which year the number of utility trucks under 6000 pounds sold in the U.S. will be 4,000,000.
Source: *www.infoplease.com*

13. $y = \pm\sqrt{\frac{x}{5}}$; no **14.** $y = \pm\sqrt{x} - 3$; no

15. $y = \pm\sqrt{\frac{x + 4}{6}}$; no **16.** $y = \pm\sqrt{\frac{x + 2}{3}}$; no

17. $y = \pm\sqrt{x + 4} - 4$; no **18.** $y = \pm\sqrt{4 - x}$; no

19. $f^{-1}(x) = 6x$; The domain and range of f and f^{-1} is the set of all real numbers; f^{-1} is a function.

20. $f^{-1}(x) = -5x + 10$; The domain and range of f and f^{-1} is the set of all real numbers; f^{-1} is a function.

21. $f^{-1}(x) = \pm\sqrt{x+2}$; Domain of f = all real numbers = range of f^{-1}; Range of f = the set of real numbers greater than or equal to -2 = domain of f^{-1}; f^{-1} is not a function.

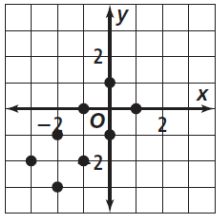
22. $f^{-1}(x) = \pm\sqrt{x-4}$; Domain of f = all real numbers = range of f^{-1}; Range of f = all real numbers greater than or equal to 4 = domain of f^{-1}; f^{-1} is not a function.

23. $f^{-1}(x) = x^2 + 1$; Domain of f = all real numbers greater than or equal to 1 = range of f^{-1}; Range of f = all real numbers greater than or equal to 0 = domain of f^{-1}; f^{-1} is a function.

24. $f^{-1}(x) = \frac{1}{3}x^2$; The domain and range of f and f^{-1} is the set of all real numbers greater than or equal to 0; f^{-1} is a function.

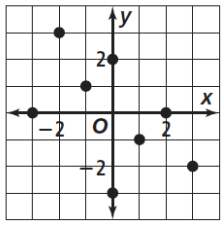
25.

x	–3	–2	–1	0
y	–2	–1	0	1



26.

x	–3	–1	0	–2
y	0	1	2	3



27. -1 **28.** 3 **29.** $-\frac{1}{2}$

30. $f^{-1}(x) = \frac{x - 635{,}600}{198{,}900}$; in 2009

Practice 9-1
1-32 Odd

1. 1 **2.** 1.2 **3.** 50 **4.** $\frac{2}{7}$ **5.** 4.2 **6.** $y = \frac{14}{x}$ **7.** $y = \frac{36}{x}$
8. $y = -\frac{24}{x}$ **9.** $y = -\frac{30}{x}$ **10.** $y = \frac{0.8}{x}$ or $y = \frac{4}{5x}$
11. $y = \frac{8}{x}$ **12.** $y = \frac{3}{x}$ **13.** $y = \frac{6.3}{x}$ or $y = \frac{63}{10x}$
14. $y = -\frac{0.3}{x}$ or $y = -\frac{3}{10x}$ **15.** I varies inversely with R.
16. A varies jointly with b and h. **17.** h varies directly with V and inversely with B. **18.** V varies directly with the cube of r.
19. $\frac{4}{3}$ **20.** -4 **21.** 2 **22.** $y = \frac{8}{x}$; 1 **23.** $y = -\frac{1}{x}$; $-\frac{1}{8}$
24. $y = \frac{7.2}{x}$ or $y = \frac{36}{5x}$; 0.9 **25.** $z = 2xy$; 48
26. $z = \frac{3x}{y^3}$; $\frac{9}{32}$ **27.** inverse; $y = \frac{20}{x}$ **28.** neither
29. direct; $y = 6x$ **30.** direct; $y = 125x$ **31.** neither
32. inverse; $y = \frac{15}{x}$

Write the function that models each relationship. Find z when $x = 6$ and $y = 4$.

25. z varies jointly with x and y. When $x = 7$ and $y = 2$, $z = 28$.

26. z varies directly with x and inversely with the cube of y. When $x = 8$ and $y = 2$, $z = 3$.

Is the relationship between the values in each table a direct variation, an inverse variation, or neither? Write equations to model the direct and inverse variations.

27.

x	2	4	5	20
y	10	5	4	1

28.

x	1	3	7	10
y	2	8	20	29

29.

x	1	2	5	7
y	6	12	30	42

30.

x	0.2	0.5	2	3
y	25	62.5	250	375

31.

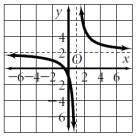
x	0.1	0.5	1.5	2
y	31	7	3	2.5

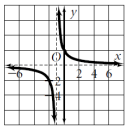
32.

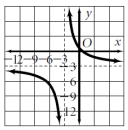
x	3	1.5	0.5	0.3
y	5	10	30	50

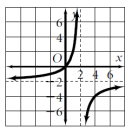
Practice 9-2 1-42 EOO

1. $y = -\frac{3}{x-2} + 1$ **2.** $y = -\frac{3}{x+1} + 3$
3. $y = -\frac{3}{x-4} - 2$ **4.** $y = -\frac{3}{x} + 6$ **5.** $y = -\frac{3}{x-3}$
6. $y = -\frac{3}{x-1} + 2$ **7.** $y = -\frac{3}{x+3} - 1$
8. $y = -\frac{3}{x+2} + 1$

9.  ; $x = 1, y = 2$

10.  ; $x = -1, y = ($

11.  ; $x = -3, y = -3$

12.  ; $x = 2, y = -2$

The junior class is buying keepsakes for the junior-senior prom. The price of each keepsake p is inversely proportional to the number of keepsakes s bought. The equation $p = \frac{1800}{s}$ models this inverse variation.

33. If they buy 240 keepsakes, how much can the class spend for each?

34. If they spend $5.55 for each keepsake, how many can the class buy?

35. If 400 keepsakes are bought, how much can be spent for each?

36. If the class buys 50 keepsakes, how much can be spent for each?

Compare the graphs of the inverse variations.

37. $y = \frac{1}{x}$ and $y = \frac{5}{x}$

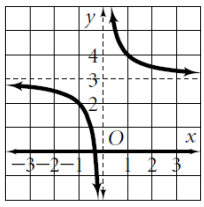
38. $y = \frac{3}{x}$ and $y = -\frac{3}{x}$

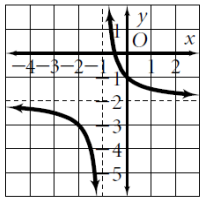
39. $y = \frac{2}{x}$ and $y = \frac{20}{x}$

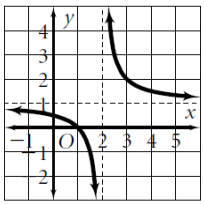
40. $y = -\frac{1}{x}$ and $y = -\frac{10}{x}$

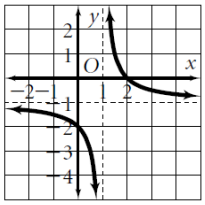
41. $y = \frac{6}{x}$ and $y = -\frac{6}{x}$

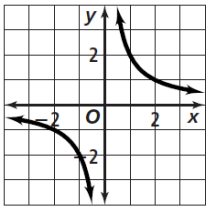
42. $y = \frac{0.2}{x}$ and $y = \frac{0.02}{x}$

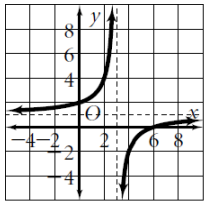
13.  ; $x = 0, y = 3$

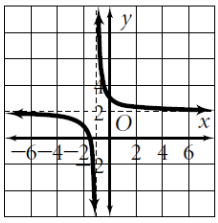
14.  ; $x = -1, y = -2$

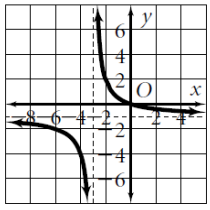
15.  ; $x = 2, y = 1$

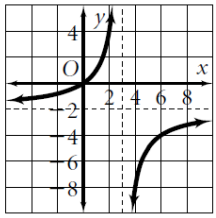
16.  ; $x = 1, y = -1$

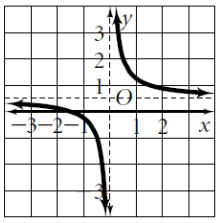
17.  ; $x = 0, y = 0$

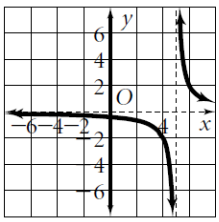
18.  ; $x = 3, y = 1$

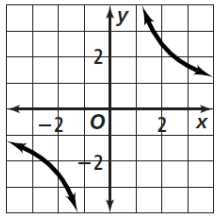
19.  ; $x = -1, y = 2$

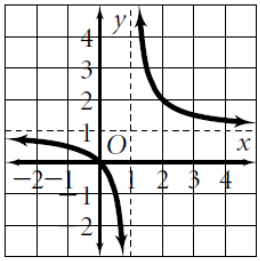
21.  ; $x = -3, y = -1$

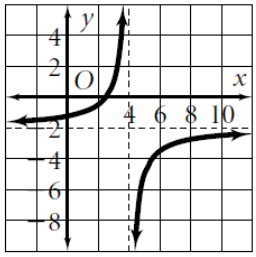
23.  ; $x = 3, y = -2$

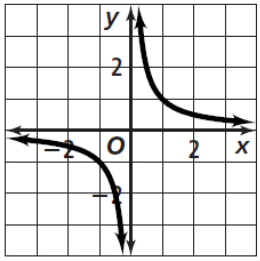
20.  ; $x = 0, y = 0.5$

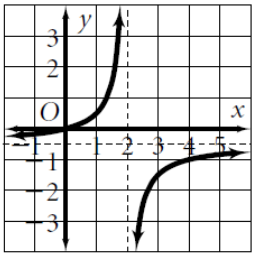
22.  ; $x = 5, y = 0$

24.  ; $x = 0, y = 0$

25.  ; $x = 1, y = 1$

27.  ; $x = 4, y = -2$

26.  ; $x = 0, y = 0$

28.  ; $x = 2, y = -0.5$

29. 2.25 ft **30.** 412.5 Hz **31.** 825 Hz **32.** 165 Hz **33.** $7.50 **34.** 324 keepsakes **35.** $4.50 **36.** $36.00 **37.** Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the branches of $y = \frac{1}{x}$ are closer to the axes than are the branches of $y = \frac{5}{x}$. **38.** Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the y-axis is a line of reflection of the two graphs. **39.** Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the branches of $y = \frac{2}{x}$ are closer to the axes than are the branches of $y = \frac{20}{x}$.

40. Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the branches of $y = -\frac{1}{x}$ are closer to the axes than are the branches of $y = -\frac{10}{x}$. **41.** Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the y-axis is a line of reflection of the two graphs. **42.** Answers may vary. Sample: The axes are asymptotes for both graphs; both are symmetric with respect to $y = x$ and $y = -x$; the branches of $y = \frac{0.02}{x}$ are closer to the axes than are the branches of $y = \frac{0.2}{x}$.