

ANSWERS

1. (a) $\frac{25}{9}$ (b) 6
2. (a) $\frac{9}{25}$ (b) $\sqrt{63}$ (c) $\frac{a}{b^{33/8}}$
3. $\frac{1}{3(\sqrt{x^2+1}+x)}$
4. $\frac{2(3x+1)}{x}$
5. (a) $\frac{-2}{(x-2)(a-2)}$ (b) $-\frac{2x+h}{x^2(x+h)^2}$
6. $\frac{3x(2x+3)}{(x+3)(2x-3)}$
7. (a) 2 (b) $-\sqrt{2}-4i\sqrt{6}$
8. (a) $\{1, 81\}$ (b) $\left\{\pm\frac{\sqrt{5}}{5}, \pm\frac{\sqrt{6}}{2}\right\}$ (c) $\{3\}$
- (d) $\left\{\frac{3}{2}+\frac{\sqrt{3}}{2}i, \frac{3}{2}-\frac{\sqrt{3}}{2}i\right\}$ (e) $\{1.33, 1.33666\dots\}$
9. $\left\{-\frac{26}{9}\right\}$
10. $\left\{-\frac{7}{3}, -4\right\}$
11. $w = \frac{S-2hl}{2l+2h}$
12. $-100 \pm 100\sqrt{\frac{A}{P}}$
13. (a) $(-\infty, -6) \cup (4, \infty)$ (b) $[-2, 0) \cup (1, 2]$ (c) $\left(-4, -\frac{7}{3}\right) \cup [2, 5]$ (d) $(3, \infty)$
14. $(x+2)^2 + (y-5)^2 = 13$
15. (a) $F = k\frac{ws^2}{r}$ (b) 48 mi/h
16. (1, 4)
17. (a) $\frac{-1}{5}, -a^2-4a, -2x-h-2$ (b) $3, \frac{1}{a+2}, \frac{-1}{(x+h+1)(x+1)}$

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(c) $\frac{1}{7}, 7, 0$

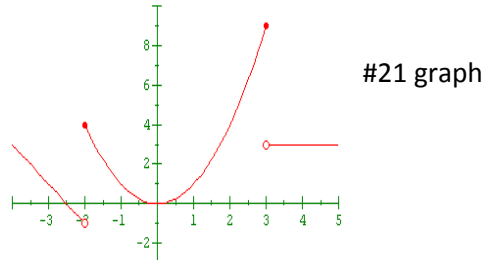
(d) $\frac{1}{\sqrt{2}}, \sqrt{a+1}, \frac{1}{\sqrt{x+h} + \sqrt{x}}$

18. (a) -1.8 (b) $-1.5, 1.7$

19. Domain is $(-\infty, -1) \cup (-1, \infty)$ and the Range is $(-\infty, -3] \cup [0, \infty)$

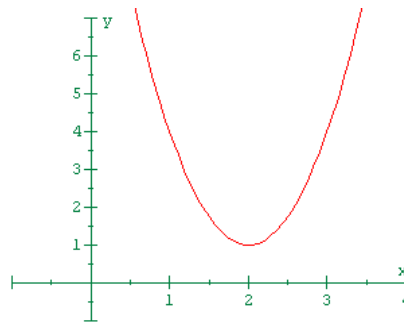
20. $[5/2, 7) \cup (7, \infty)$

21.



22. $y = -4x + \frac{51}{2}$

23. Vertical stretch factor of 3
Horizontal shift 2 right
Vertical shift 1 up



24. (a) $y = 2\left(x - \frac{7}{4}\right)^2 - \frac{25}{8}$; Vertex $\left(\frac{7}{4}, -\frac{25}{8}\right)$

(b) Line of symmetry $x = \frac{7}{4}$

(c) Range: $\left[-\frac{25}{8}, \infty\right)$

(d) Minimum

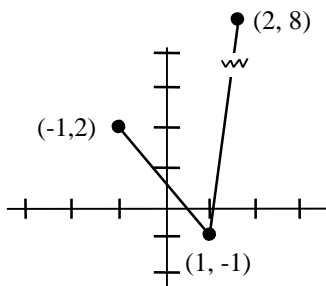
25. $f(x) = (x-2)^2 + 3$

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26. (a) $\sqrt{x-1} + x^2 + 2$ (b) 54 (c) $\sqrt{26}$ (d) $\sqrt{x^2 + 1}$
 (e) $(-\infty, \infty), [1, \infty)$

27. $f(x) = -\frac{5}{8}x - \frac{41}{8}$

28.

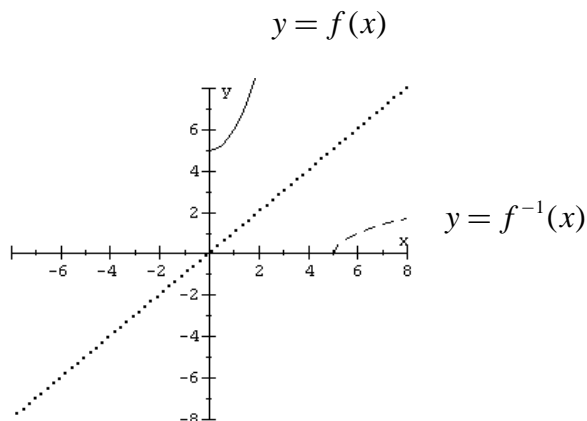


29. $y = -2(x+3)^2 - 5$

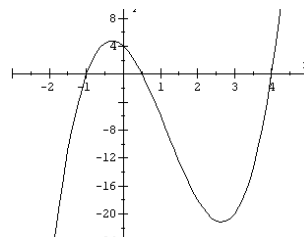
30. $g^{-1}(5) = 1$

31. $f^{-1}(x) = \frac{5x+3}{2-x}$

32.



33. (a) See sketch
 (b) Local Max. = $(-0.31, 4.82)$
 Local Min. = $(2.65, -21.19)$
 (c) Increasing: $(-\infty, -0.31) \cup (2.65, \infty)$
 Decreasing: $(-0.31, 2.65)$



34. Odd

35. Quotient = $4x^2 + 5x + 15$; remainder = 47

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36. $f(-1) = 7 \therefore \text{remainder} = 7$

37. $Q(x) = x + 2; R(x) = 4x + 13$

38. Yes.

39. $k = -\frac{11}{5}$

40. $f(x) = a(x+2)(x-3)(x-4-i)(x-4+i) = a(x+2)(x-3)(x^2 - 8x + 17)$

41. $f(x) = 2(x-2)(x-3) = 2x^2 - 10x + 12$

42. Domain: $[0, \infty)$; Range: $[3, \infty)$

43. $x = \frac{16}{7}$

44. $\{-7, 1, \pm 2i\}$

45. $\{-1.44, 0.41, 1.70\}$

46. (a) $x = -4; x = -1$

(b) $y = 0$

(c) Domain: $(-\infty, -4) \cup (-4, -1) \cup (-1, 0) \cup (0, \infty)$

47. See sketch at right.

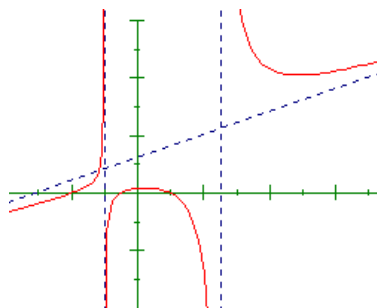
(a) $\{-4, -1, 2\}$

(b) Y-int = $\frac{4}{5}$

(c) V.A. $x = -2, x = 5$

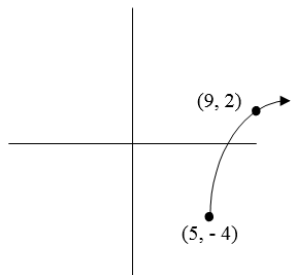
(d) H.A. None

(e) $y = x + 6$



48. $f(x) = \frac{1}{24}(x-1)(x-3)(x-4)^2$

49.

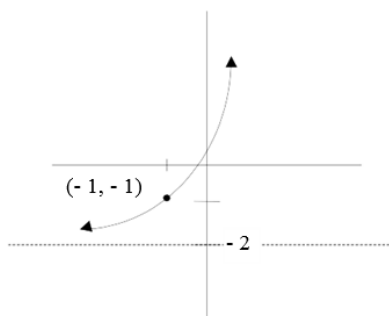


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50. Domain: $(-\infty, \infty)$

Range: $(-2, \infty)$

H.A. $y = -2$



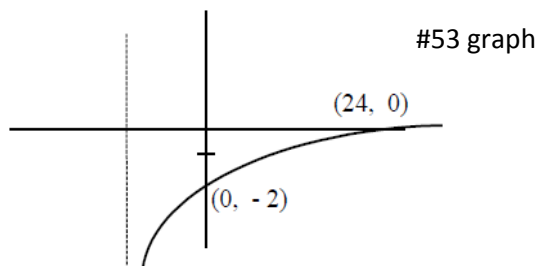
51. $\left\{-\frac{1}{2}, 2\right\}$

52. (a) no solution (b) $\{4\}$ (c) $\{8\}$

53. Domain: $(-1, \infty)$

Range: $(-\infty, \infty)$

V.A. $x = -1$



54. $\left\{\frac{39}{2}\right\}$

55. $\log a + 2\log b - \frac{1}{2}\log 2 - \frac{1}{2}\log c$

56. $\log_4 \frac{x^5}{\sqrt{3x-4}(5x+1)^3}$

57. $\frac{\ln 21 - \ln 5 + \ln 4}{2 \ln 4}$, or equivalent.

58. (a) -6.34 (b) 13.22

59. (a) 3.26 (b) 3.15 (c) -2.58 (d) 1.28

60. (a) $(0, 1) \cup (1, \infty)$ (b) $(-\infty, 6) \cup (17, \infty)$

61. 2.1 cm

62. 5.22 years

63. 110.02 days

64. $13,500$

65. 250 yd by 500 yd

66. 6.35 feet

67. (a) 109.77 feet (b) 3.40 sec.

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68. $V < 31.23$ $(0, 31.23)$

69. (a) $k \approx 0.1507$; $A(t) = 17,000e^{0.1507t}$ where $A(t)$ is in dollars and t is the number of years after 1952.

(b) \$479,650,669

(c) 4.6 yr

(d) 63.4 yr

70. (a) $y = \frac{5}{x}$ (b) $S = 4x + \frac{20}{x} + 5$

71. (a) 2.5 inches or 7.29 inches (b) 4.70 inches

72. (a) $F(x) = \begin{cases} 15(40 - x) & \text{if } 0 < x < 40 \\ 0 & \text{if } 40 \leq x \leq 65 \\ 15(x - 65) & \text{if } x > 65 \end{cases}$

(b) $F(30) = \$150$; $F(50) = \$0$; and $F(75) = \$150$.

(c) The fines for violating the speed limits on the freeway.