ANSWERS

1. (a) $\frac{25}{9}$ (b) 6

2. (a) $\frac{9}{25}$ (b) $\sqrt{63}$ (c) $\frac{a}{b^{33/8}}$

3. $\frac{1}{3\left(\sqrt{x^2+1}+x\right)}$

4. $\frac{2(3x+1)}{x}$

5. (a) $\frac{-2}{(x-2)(a-2)}$ (b) $-\frac{2x+h}{x^2\left(x+h\right)^2}$

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) $\{1.33,\ 1.33666...\}$

9. $\left\{-\frac{26}{9}\right\}$

10. $\left\{-\frac{7}{3},-4\right\}$

11. $w=\frac{S-2hl}{2l+2h}$

12. $-100\pm100\sqrt{\frac{A}{P}}$

13. (a) $\left(-\infty,-6\right)\cup\left(4,\infty\right)$ (b) $[-2,0)\cup(1,2]$ (c) $\left(-4,-\frac{7}{3}\right)\cup\left[2,5\right]$ (d) $\left(3,\infty\right)$

14. $(x+2)^2+(y-5)^2=13$

15. (a) $F=k\frac{ws^2}{r}$ (b) 48 mi/h

16. $\left(1,4\right)$

17. (a) $\frac{-1}{5},\ -a^2-4a\ ,\ -2x-h-2$ (b) $3,\ \frac{1}{a+2},\ \frac{-1}{(x+h+1)(x+1)}$

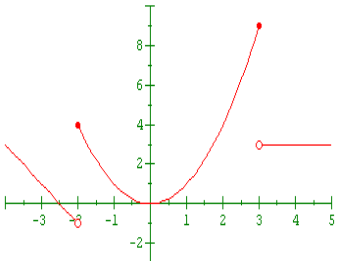
ANSWERS

(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 $(-\infty,-3]\cup[0,\infty)$

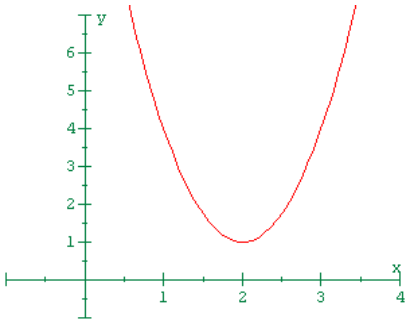
20. $[5/2,7)\cup(7,\infty)$

21. 

#21 graph

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

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



#23 graph

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

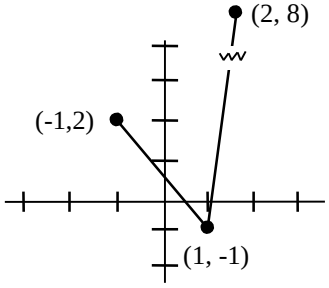
25. $f(x)=(x-2)^2+3$

ANSWERS

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.

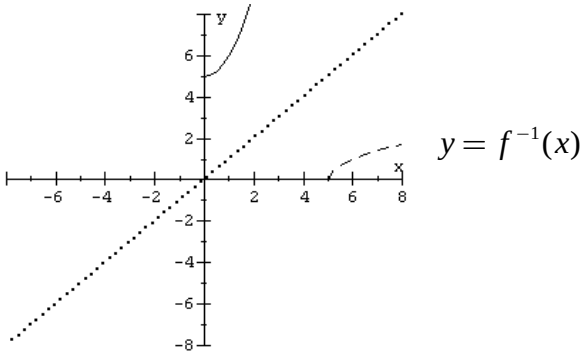


29. $y=-2(x+3)^2-5$

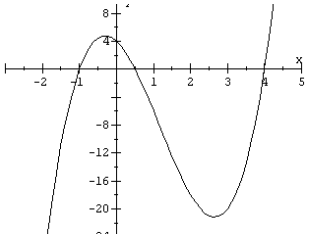
30. $g^{-1}(5)=1$

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 $=47$

ANSWERS

36. $f(-1)=7 \quad \therefore$ remainder $=7$

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

38. Yes.

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

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. $x=\dfrac{16}{7}$

44. $\{-7, 1, \pm 2i\}$ $\quad f(x)=(x+7)(x-1)(x-2i)(x+2i)$

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.

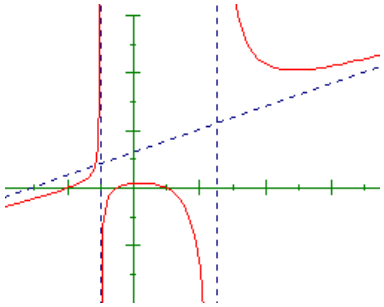
(a) $\{-4, -1, 2\}$

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

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

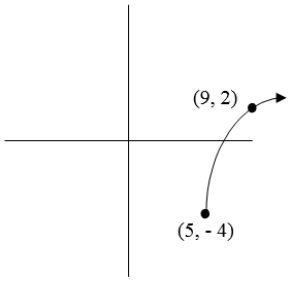
(d) H.A. None

(e) $y=x+6$



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

49.

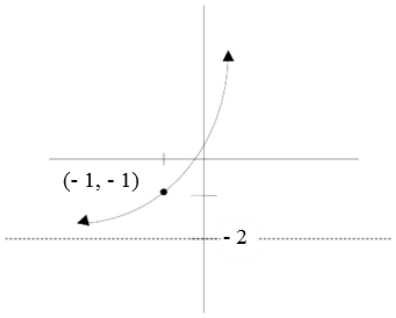


ANSWERS

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

Range: $(-2,\infty)$

H.A. $y=-2$



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

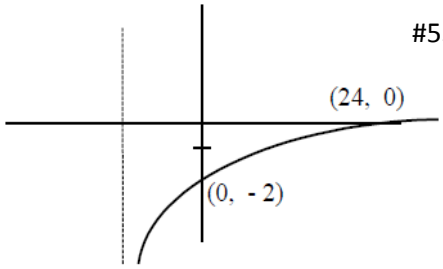
52. (a) no solution (b) $\{4\}$ (c) $\{8\}$

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

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

V.A. $x=-1$

#53 graph



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.

ANSWERS

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) $F(x) = \begin{cases} 15(40 - x) & \text{if } 0 < x < 40 \\ 0 & \text{if } 40 \le x \le 65 \\ 15(x - 65) & \text{if } x > 65 \end{cases}$
(b) F(30) = $150; F(50) = $0; and F(75) = $150.
(c) The fines for violating the speed limits on the freeway.