

1. $39, x^2 + 12x + 11, x^2 + 4x - 21$

2. $x = -\frac{3}{2}, -1$

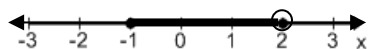
3. $m = 2, -\frac{3}{2}$

4. $b = 0, 3$

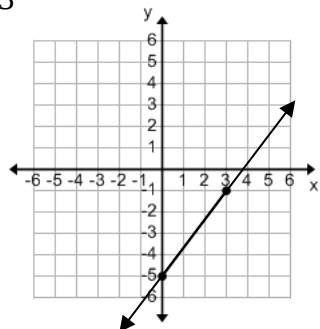
5. $x = 2 \pm \sqrt{2}$

6. $x = -1, 0.5, 1$

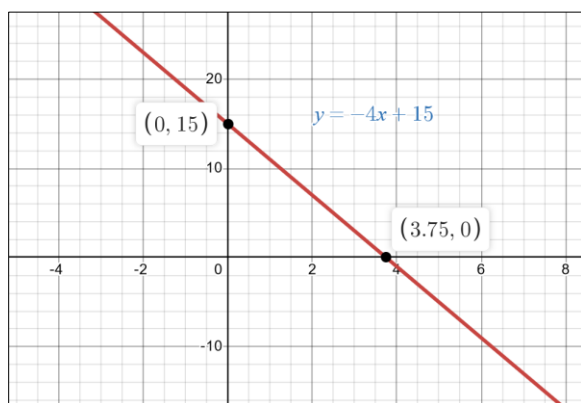
7. $\{x \mid -1 \leq x < 2\}$, or in interval notation $[-1, 2)$



8. Slope $\frac{4}{3}$, y -int $(0, -5)$

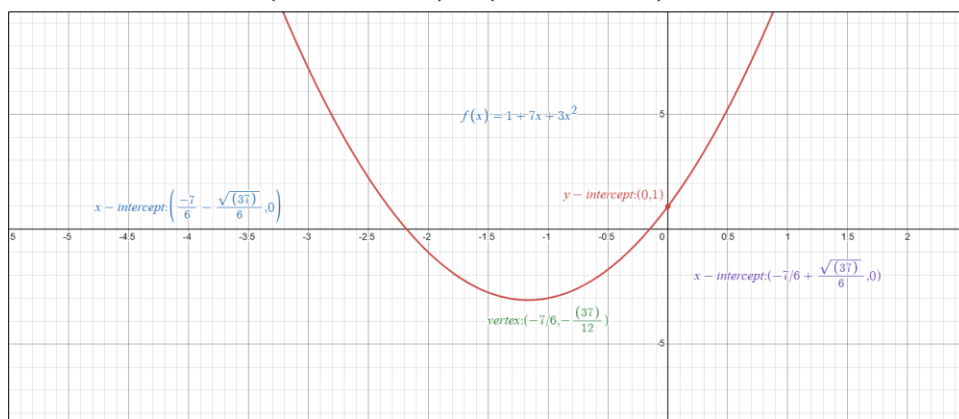


9. $y+1=-4(x-4)$ or $y=-4x+15$



10.

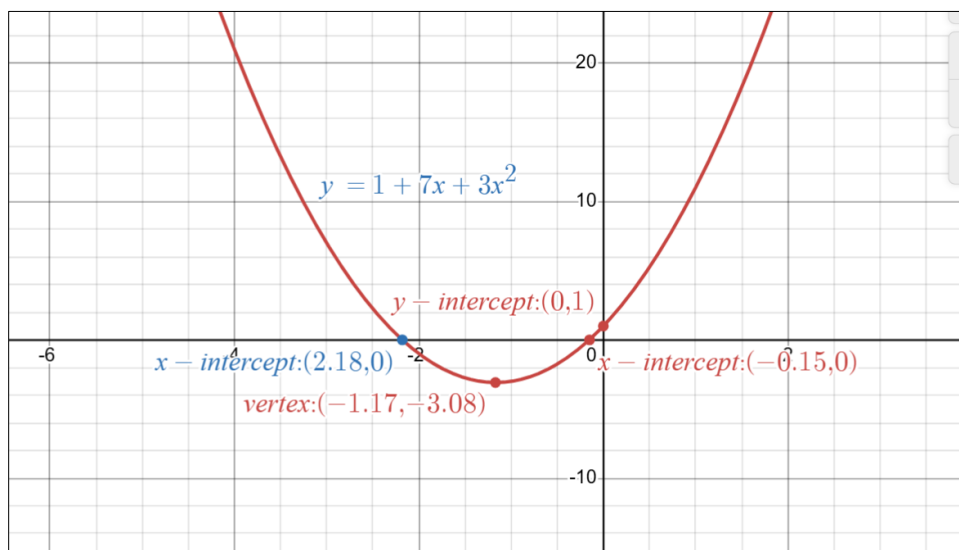
a) x -intercepts: $\left(\frac{-7}{6} - \frac{\sqrt{37}}{6}, 0\right), \left(\frac{-7}{6} + \frac{\sqrt{37}}{6}, 0\right)$; minimum: $\left(\frac{-7}{6}, \frac{-37}{12}\right)$



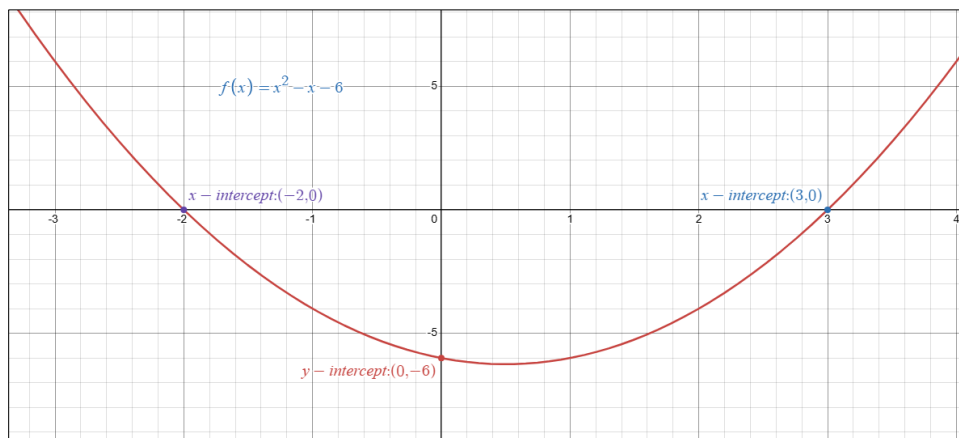
Domain: $\{x \mid x \text{ is in the set of all real numbers}\}$ OR $(-\infty, \infty)$;

Range: $\left\{y \mid y \geq \frac{-37}{12}\right\}$ OR $\left[\frac{-37}{12}, \infty\right)$

b) x -intercepts: $(-2.18, 0), (-0.15, 0)$; minimum: $(-1.17, -3.08)$

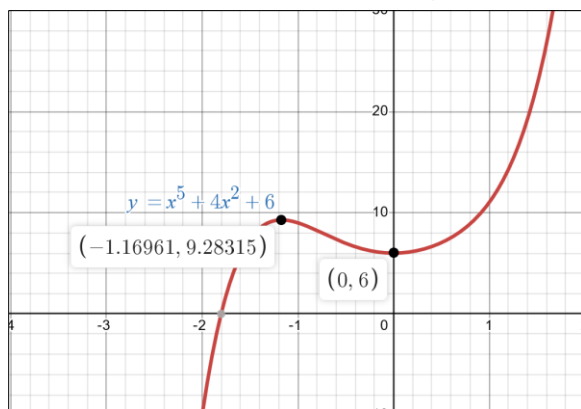


11. $x\text{-int}(3,0), (-2,0), y\text{-int}(0,-6)$

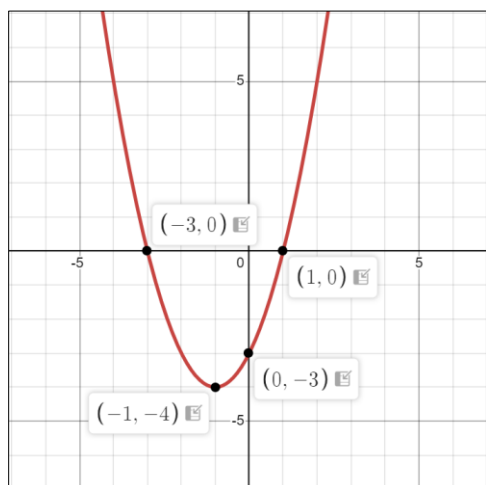


12. $y = -6(x-3)^2 + 4$

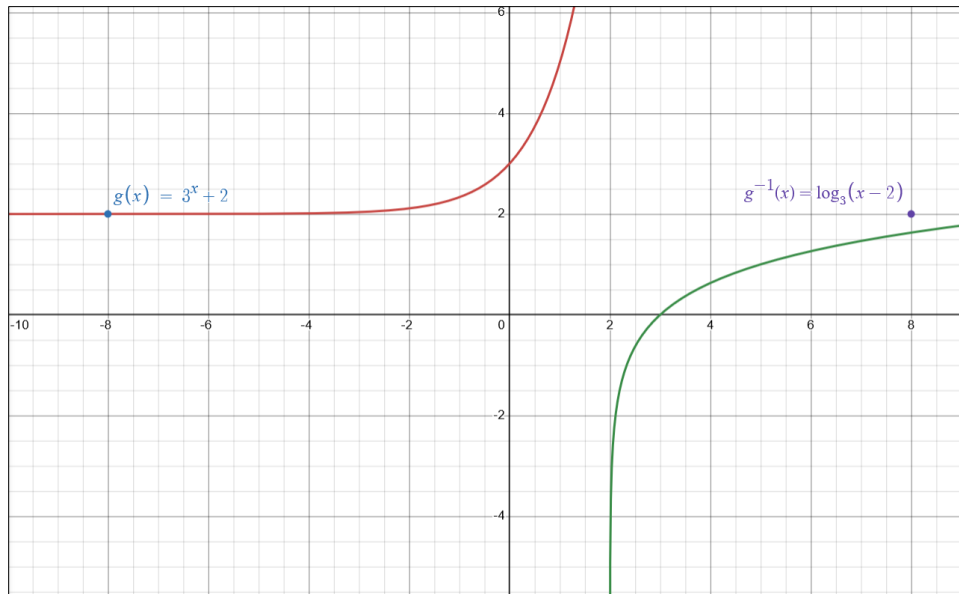
13. Local Max of 9.28 at $x = -1.17$, Local Min of 6 at $x = 0$.



14. a) opens up, Vertex $(-1, -4)$, $y\text{-int}(0, -3)$; $x\text{-int}(-3, 0)$ and $(1, 0)$;
axis of symmetry $x = -1$
b) $[-3, 1]$



15. a) Domain: $\{x \mid x \text{ is in the set of all real numbers}\}$ OR $(-\infty, \infty)$;
 Range: $\{y \mid y > 2\}$ OR $(2, \infty)$;
 Horizontal Asymptote: $y = 2$



b) $g^{-1}(x) = \log_3(x-2) = \frac{\log(x-2)}{\log 3} = \frac{\ln(x-2)}{\ln 3}$

Domain: $\{x \mid x > 2\}$ OR $(2, \infty)$

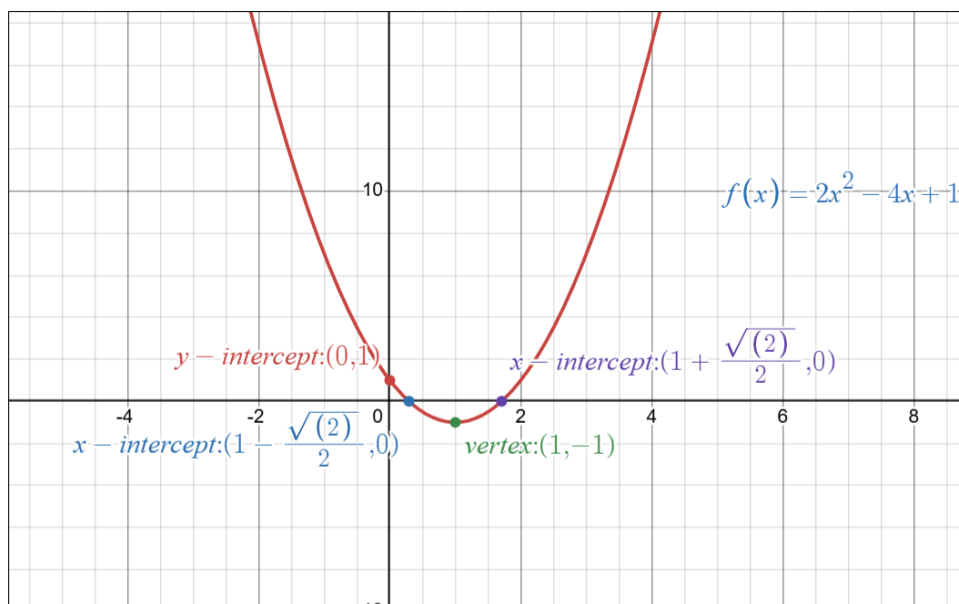
Range: $\{y \mid y \text{ is in the set of all real numbers}\}$ OR $(-\infty, \infty)$;

Vertical Asymptote: $x = 2$

c) See graph above.

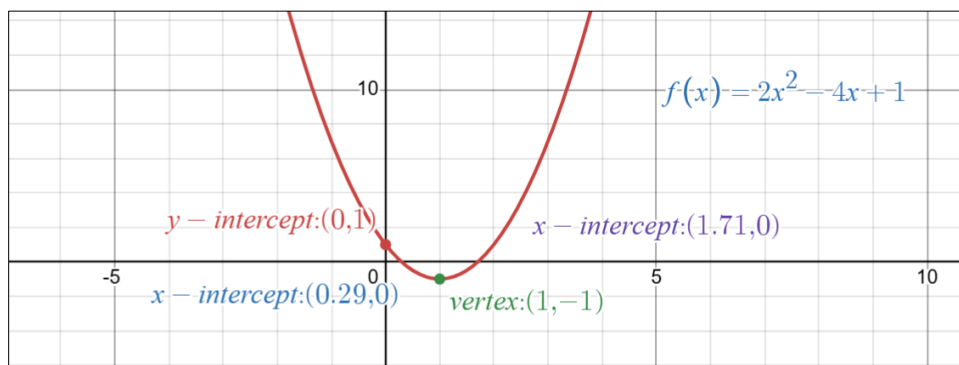
16. a) opens up, vertex $(1, -1)$, axis of symmetry $x = 1$

y -int $(0, 1)$, x -int $\left(1 - \frac{\sqrt{2}}{2}, 0\right), \left(1 + \frac{\sqrt{2}}{2}, 0\right)$

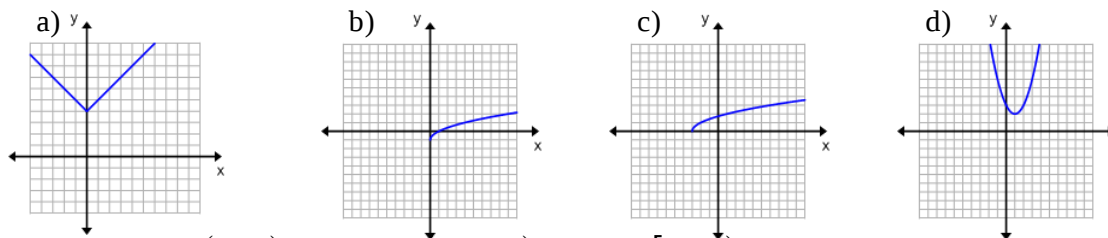


b) opens up, vertex $(1, -1)$, axis of symmetry

$x = 1$, y -int $(0, 1)$, x -int $(0.29, 0), (1.71, 0)$



17.



a) y -int: $(0, 4)$, Domain: $(-\infty, \infty)$, Range: $[4, \infty)$

b) x -int: $(1, 0)$, y -int: $(0, -1)$, Domain: $[0, \infty)$, Range: $[-1, \infty)$

c) x -int: $(-3, 0)$, y -int: $(0, \sqrt{3})$, Domain: $[-3, \infty)$, Range: $[0, \infty)$

d) y -int: $(0, 3)$, Domain: $(-\infty, \infty)$, Range: $[2, \infty)$

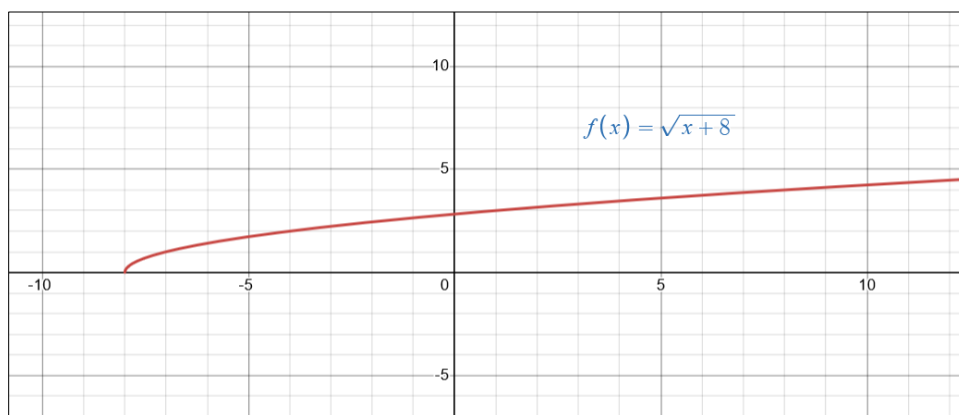
18. NO, it does not pass the vertical line test.

19. a) $h(-2) = 2$, $h(0) = 0$, $h(2) = 4$

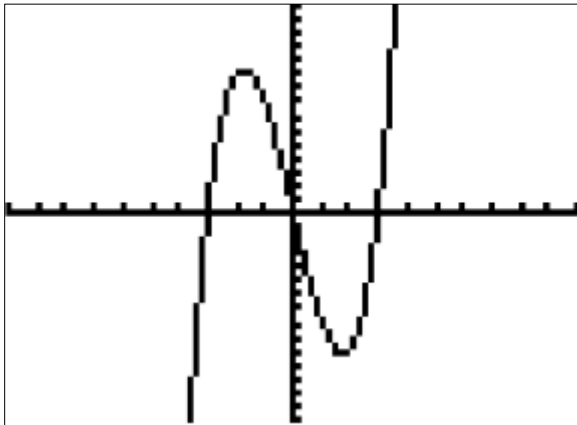
b) $D: [-3, 4]$, $R: [0, 5]$

c) $x = -3, 2, 4$

20. $D: [-8, \infty)$, $R: [0, \infty)$

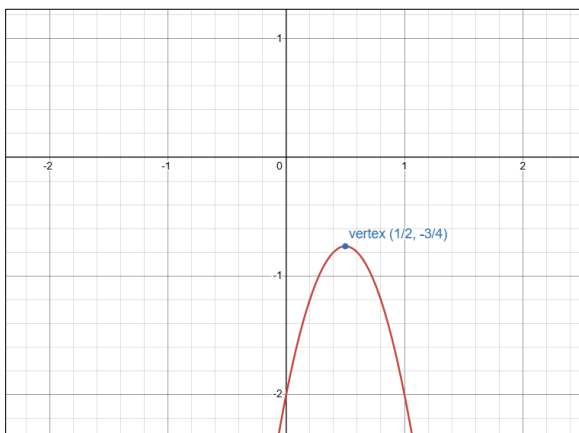


21. a) local max $(-1.73, 10.39)$, local min $(1.73, -10.39)$
 b) f is increasing on $(-\infty, -1.73)$ and on $(1.73, \infty)$ f is decreasing on $(-1.73, 1.73)$

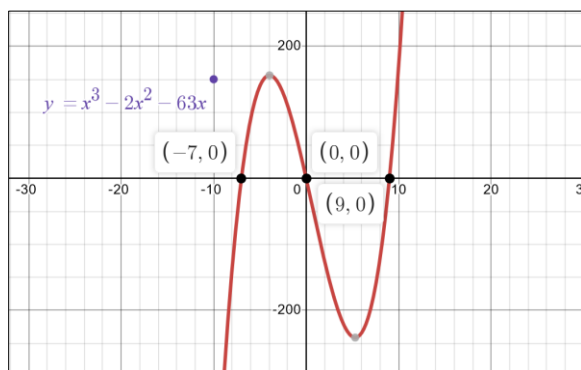


22. opens down, Vertex $\left(\frac{1}{2}, -\frac{3}{4}\right)$, y -int $(0, -2)$; there are not any x -intercepts;

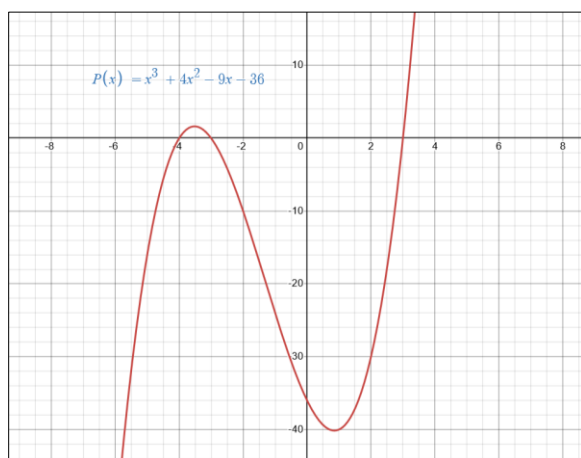
axis of symmetry $x = \frac{1}{2}$



23. $x = 0, -7, 9$



24. $x = -4, -3, 3$



25. x -int $(-1, 0)$, y -int $\left(0, -\frac{1}{2}\right)$

Domain: $\{x | x \neq 2\}$

26. x -int $(-5, 0)$ and $(4, 0)$ y -int (none)

Domain: $\{x | x \neq 0\}$

27. x -int $\left(-\frac{7}{3}, 0\right)$ y -int $\left(0, -\frac{7}{2}\right)$, vertical asymptote $x = -\frac{2}{7}$

28. x -int $(2, 0)$ y -int $(0, 2)$, vertical asymptote $x = 1$ and $x = -3$

29. $x = 1$

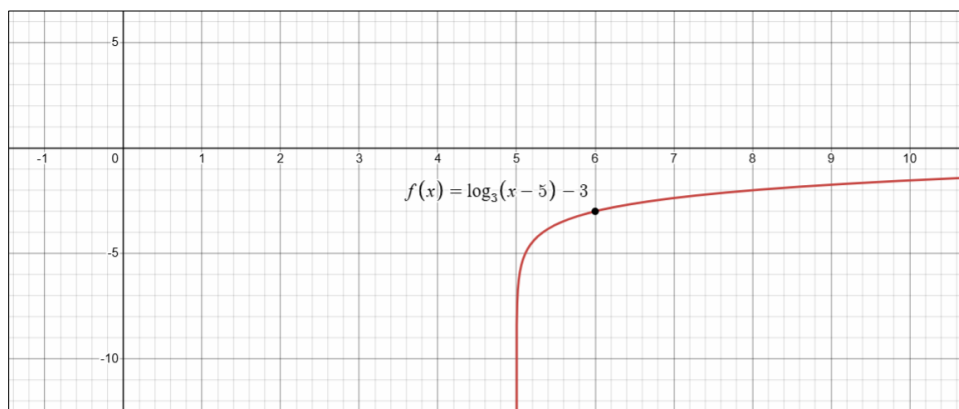
30. a) 8 unit shift to the left
b) 8 unit shift up

31. $g(x) = x^3 - 3$

32. $g(x) = \sqrt[3]{x-3}$

33. $g(x) = 4(x-5)^2 - 3$

34.



35. $T = k \cdot \sqrt[3]{x} \cdot d^2$

36. $y - 5 = -\frac{2}{3}(x - 1), 2x + 3y = 17, y = \frac{-2}{3}x + \frac{17}{3}$

37. $x = -3$

38. $y + 3 = -1(x - 1), x + y = -2, y = -x - 2$

39. $y - 10 = 3(x - 1), -3x + y = 7, y = 3x + 7$

40. $y + 5 = -\frac{1}{2}(x - 1), x + 2y = -9, y = -\frac{1}{2}x - \frac{9}{2}$

41. $\frac{2}{5}$

42. \$50,000 in A Bonds and \$20,000 in CDs.

43. $P = 2l + 2w$

44. $6 \frac{2}{3}$ pounds of the \$8 per pound coffee, $26 \frac{2}{3}$ pounds of the \$5 per pound coffee

45. a) D is $[-5, 5]$; R is $[-3, 3]$

b) $x - \text{int } (-2, 0) (2, 0), y - \text{int } (0, 2)$

c) 3

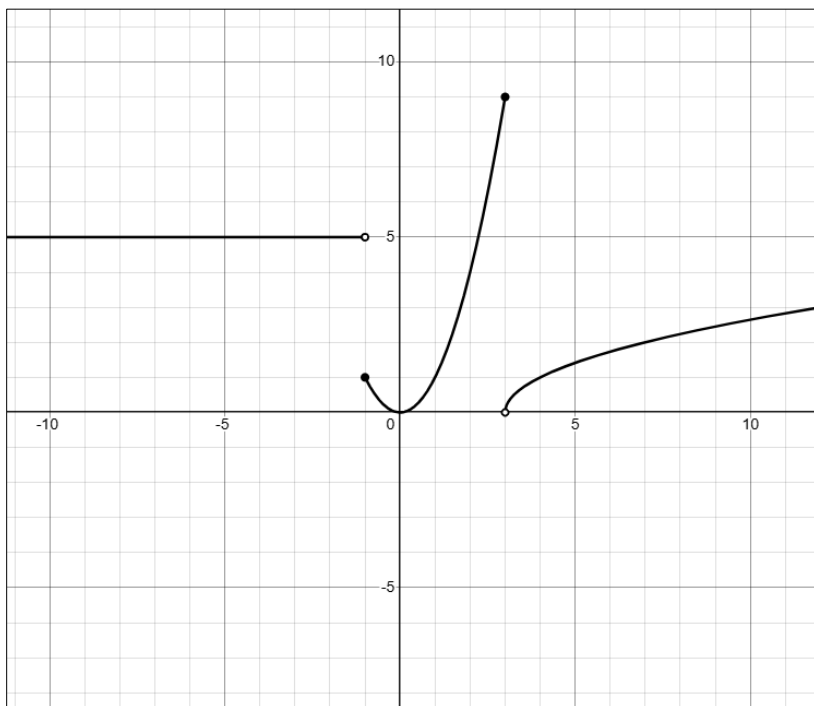
d) $x = -5, 3$

e) $[-5, -2) \cup (2, 5]$

46. $x \leq \frac{4}{5}, f(-1) = 3$

47. Domain: $\{x \mid x \text{ is all real numbers}\}$

Range: $\{y \mid y \geq 0\}$



48. Domain: $\{x \mid x \text{ is any real number except } -1\}$

49. Domain: $\{x \mid x \text{ is any real number except } 5 \text{ and } -6\}$

50. Domain: $\{x \mid x \leq -10 \text{ or } x \geq 10\}$

51. $[0, 6]$

52. a) $f(g(x)) = \frac{2x+7}{2x+3}$, $D: \left\{x \mid x \text{ is any real number except } -\frac{3}{2}\right\}$

b) $g(f(-2)) = 5$

c) $f(g(-2)) = -3$

53. a) $\sqrt{11}$

b) 1

c) $\sqrt{\sqrt{6}+2}$

d) 19

54. a) $(f+g)(x) = 3x^2 + 4x + 1$, $D: (-\infty, \infty)$, $R: \left[\frac{-1}{3}, \infty\right)$

$$\text{b) } (f - g)(x) = 3x^2 - 2x + 1, \text{ D: } (-\infty, \infty), \text{ R: } \left[\frac{2}{3}, \infty \right)$$

$$\text{c) } (f \cdot g)(x) = 9x^3 + 3x^2 + 3x, \text{ D: } (-\infty, \infty), \text{ R: } (-\infty, \infty)$$

$$\text{d) } \left(\frac{f}{g} \right)(x) = \frac{3x^2 + x + 1}{3x}, \text{ D: } \{x \mid x \text{ is any real number except } 0\}$$

$$55. \text{ a) } (f + g)(x) = \frac{4x - 9}{x(x - 3)}, \text{ D: } (-\infty, 0) \cup (0, 3) \cup (3, \infty)$$

$$\text{b) } (f - g)(x) = \frac{-2x + 9}{x(x - 3)} \text{ D: } \{x \mid x \text{ is any real number except } 0 \text{ and } 3\}$$

$$\text{c) } (f \cdot g)(x) = \frac{3}{x(x - 3)}, \text{ D: } \{x \mid x \text{ is any real number except } 0 \text{ and } 3\}$$

$$\text{d) } \left(\frac{f}{g} \right)(x) = \frac{x}{3(x - 3)}, \text{ D: } \{x \mid x \text{ is any real number except } 0 \text{ and } 3\}$$

$$56. \text{ a) } f^{-1}(x) = \frac{2 + 5x}{3x}$$

$$\text{b) Check that } f[f^{-1}(x)] = x \text{ and vice versa, } f^{-1}[f(x)] = x$$

$$\text{c) Domain of } f: \left\{ x \mid x \text{ is any real number except } \frac{5}{3} \right\}$$

$$\text{Range of } f: \{y \mid y \text{ is any real number except } 0\}$$

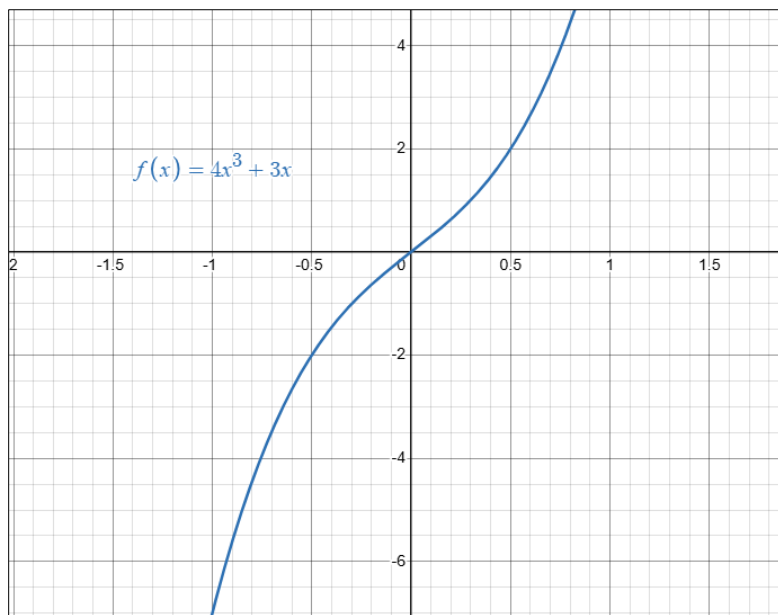
$$\text{d) Domain of inverse: } \{x \mid x \text{ is any real number except } 0\}$$

$$\text{Range of inverse: } \left\{ y \mid y \text{ is any real number except } \frac{5}{3} \right\}$$

$$57. \quad f^{-1}(x) = \frac{5x + 5}{1 - x}$$

$$58. \quad f^{-1}(x) = \sqrt[3]{1 - x}$$

59. Yes, each x has exactly one y and each y has exactly one x . Use the vertical line test and the horizontal line test.



60. 3 and -1

61. $\frac{4}{5}$

62. $2, -\frac{1}{3}$

63. -7

64. $125^{\frac{1}{3}} = 5$

65. 5

66. 1

67. $-\frac{3}{2}$

68. $\log(0.0001) = -4$

69. a) 3
b) 2
c) 1

70. 4

71. 625

72. a) π
b) 40
c) 90

73. a) 16
b) -1

74. $-\ln(2)$

75. $\frac{1 \pm \sqrt{13}}{2}$

76. $\frac{-3\ln(7)}{\ln(7)-1} \approx -6.17$

77. $2\sqrt{6}$

78. a) 6 grams
b) 4.677 grams
c) 5 days

79. a) \$5,402.28
b) \$6,711.69
c) 10 years

80. \$8,374.84

81. a) 49
b) 64

82. a) $(0, \infty)$
b) $f^{-1}(x) = 6^x$

83. 3

84. $8\log_a(x) - \log_a(y) - 9\log_a(z)$

85. $\frac{1}{6}\log_7(x-5) - \frac{1}{6}\log_7(x+5)$

86. $x - \log x - \log(x^4 + 2) - \log(x^6 + 6)$

87. $\log_3 \left(\frac{A^5 B^3}{C^5} \right)$

88. $\log \frac{\sqrt[4]{x^2+1}(x-1)}{x^5}$

89. 1.130930

90. $\frac{\log 8}{\log 7}$

91. -6.4895

92. $\ln(4)$

93. 9, -9

94. 109

95. 20

96. 6

97. 9

98. a) 384 million
b) 299 million

99. a) 46.2 grams
b) 35.7 days
c) 25.2 days

100. a) 206 degrees
b) 150.13 degrees
c) 27.45 minutes

101. $x=2, y=1$ or $(2, 1)$

102. No Solution

103. Infinite Solutions $\left(x, \frac{1}{5}x + 4 \right)$

104. $(-10, 8, -2)$

105. Infinite Solutions $(26-3z, -11+2z, z)$ Z is any real number.

106. No Solutions

107. 8, 9, 10, 11 and 107

108. 5, 4, 0, -16, -80

109. $a_n = 2 \cdot 2^{n-1} = 2^n$

110. $a_n = 2 + 6(n-1) = 6n - 4$

111. 55

112. 8

113. 380

114. $\sum_{k=5}^{14} k^2$

115. $a_n = 6 + 2(n-1) = 2n + 4$, $a_{10} = 24$

116. $d = 4$, $a_5 = 19$, $a_n = 3 + 4(n-1)$ OR $a_n = 4n - 1$, $a_{100} = 399$

117. 105

118. 1,410

119. $\frac{2}{3}$