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

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

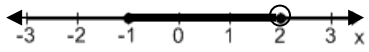
3. $m=2,\ -\frac{3}{2}$

4. $b=0,\ 3$

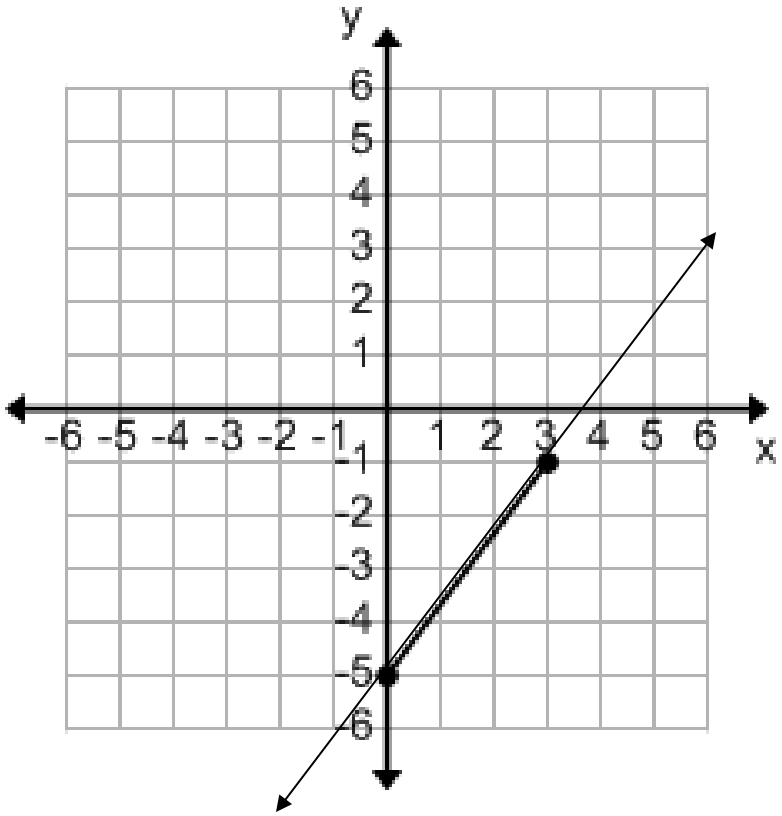
5. $x=2\pm\sqrt{2}$

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

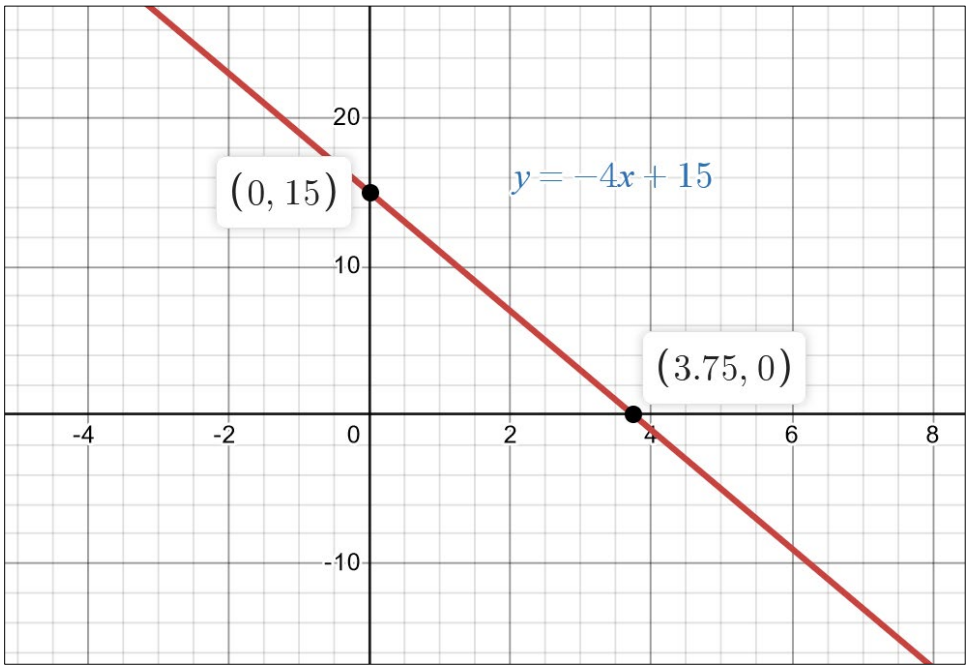
7. $\{x \mid -1\le x<2\}$, or in interval notation $[-1,2)$



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

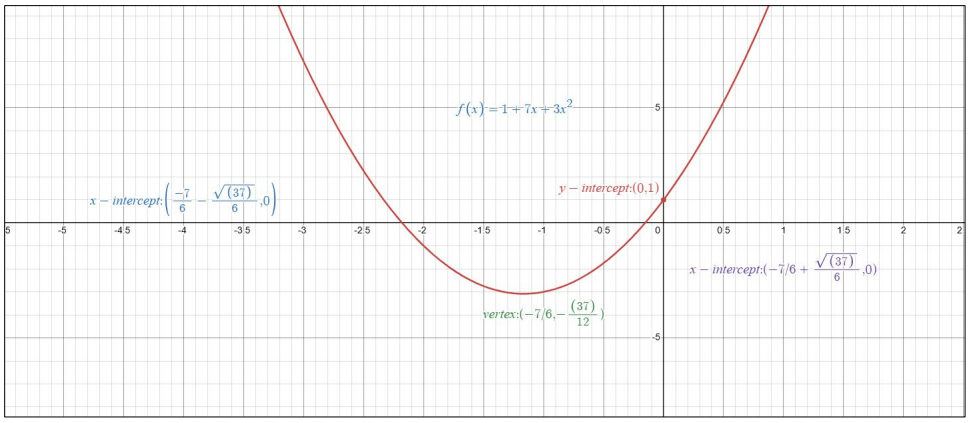


9. $y+1=-4(x-4)$ or $y=-4x+15$



10.

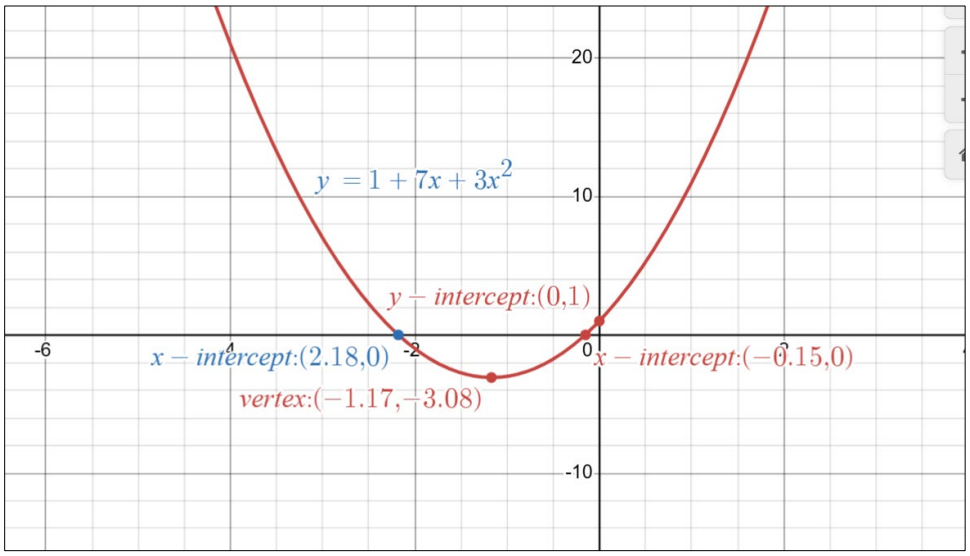
a) $x-intercepts:\left(\frac{-7}{6}-\frac{\sqrt{37}}{6},0\right),\left(\frac{-7}{6}+\frac{\sqrt{37}}{6},0\right)$; minimum: $\left(\frac{-7}{6},\frac{-37}{12}\right)$



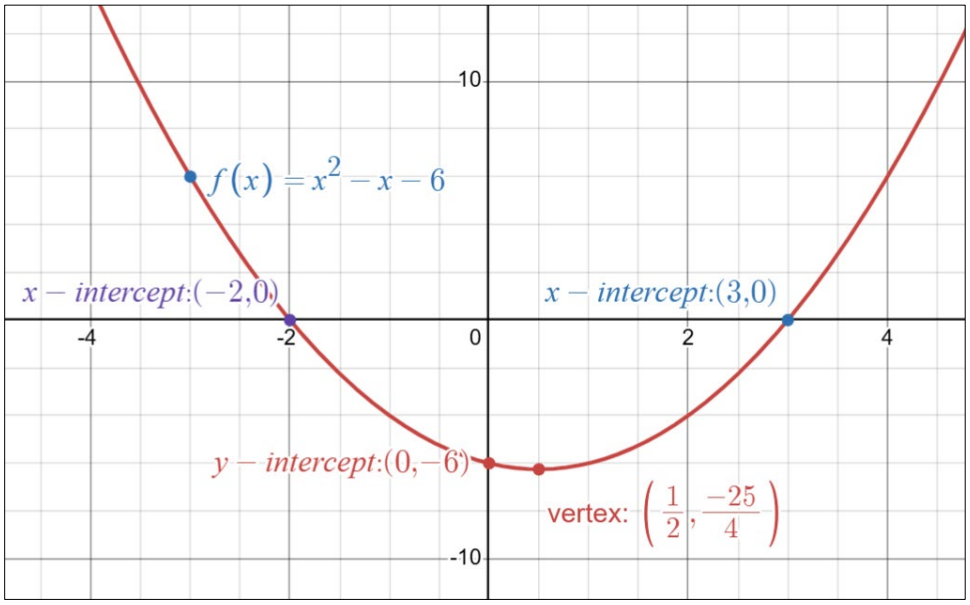
Domain: $\{x \mid x \text{ is in the set of all real numbers}\}$ OR $(-\infty,\ \infty)$;

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

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

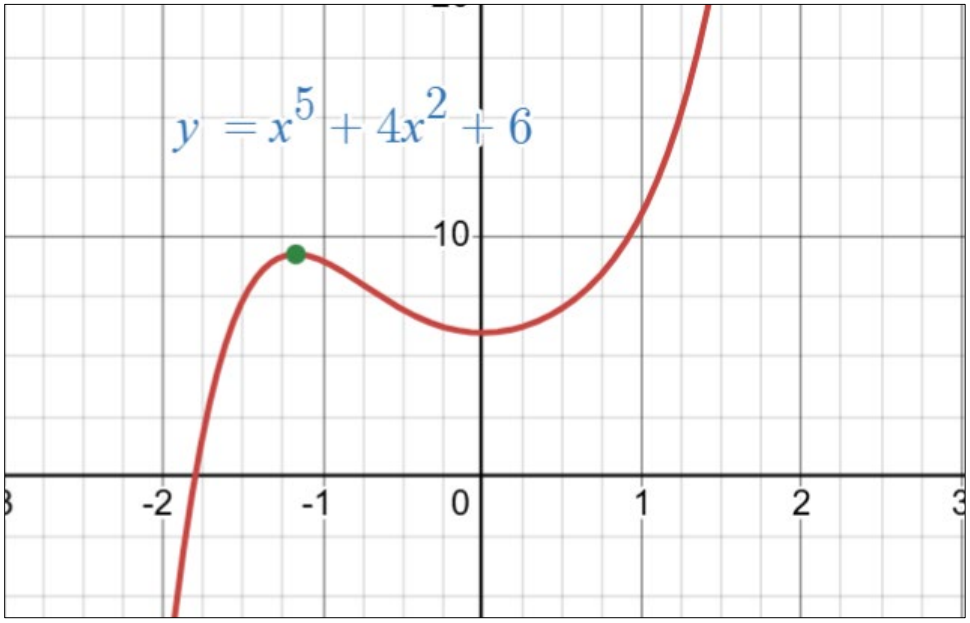


11. $vertex:\left(\frac{1}{2},-\frac{25}{4}\right),\ x-int(3,0),\ (-2,0),\ y-int(0,-6)$



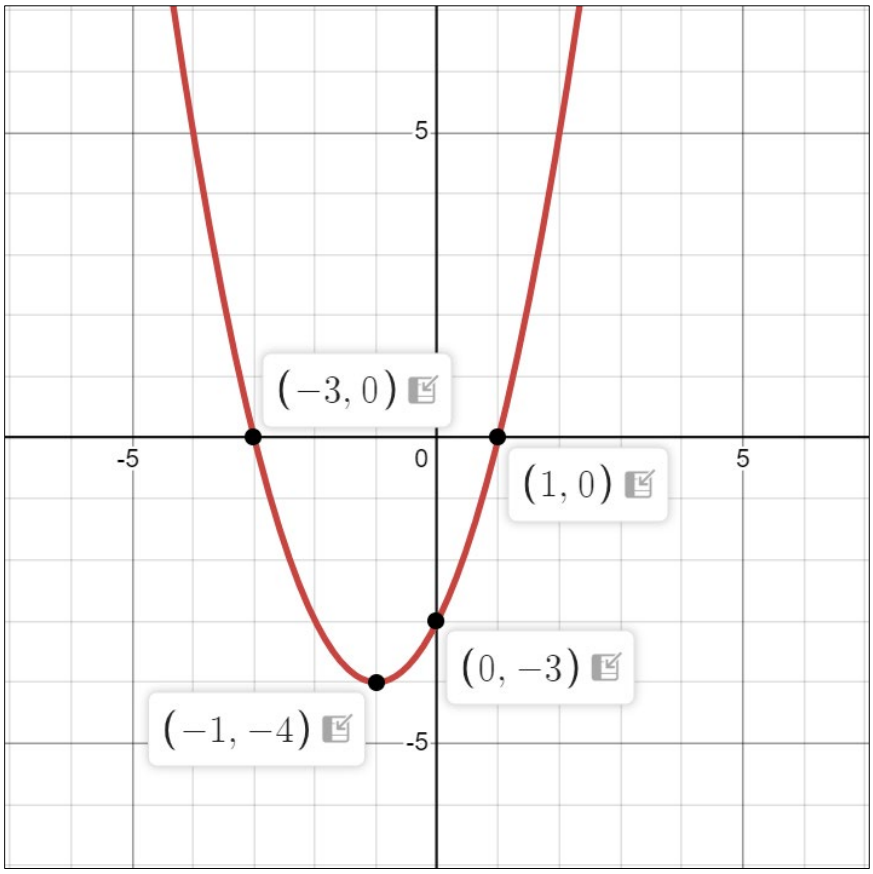
12. $y = -6(x-3)^2 + 4$

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



14. a) opens up, Vertex $(-1, -4)$, $y-int$ $(0,-3)$; $x-int$ $(-3,0)$ and $(1,0)$; axis of symmetry $x = -1$

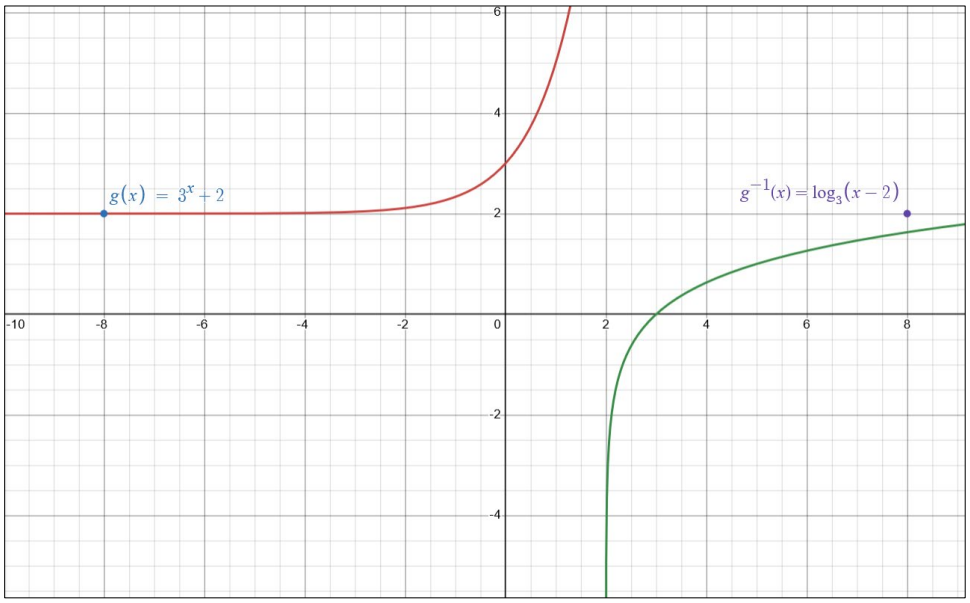
b) $[-3, 1]$



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

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

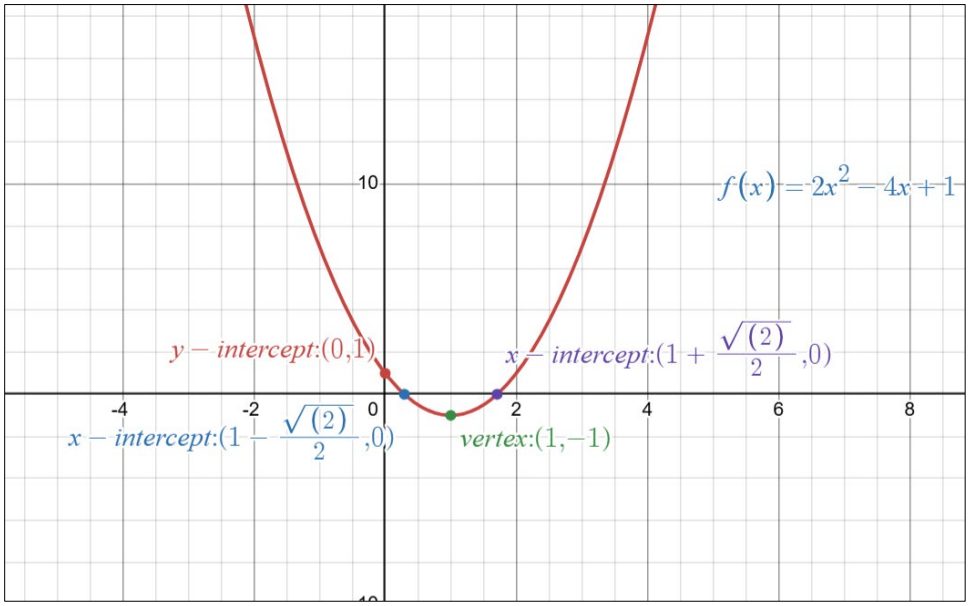
Range: $\{y \mid y \text{ is in the set of all real numbers}\}$ OR $(-\infty, \infty)$;

Vertical Asymptote: $x = 2$

c) See graph above.

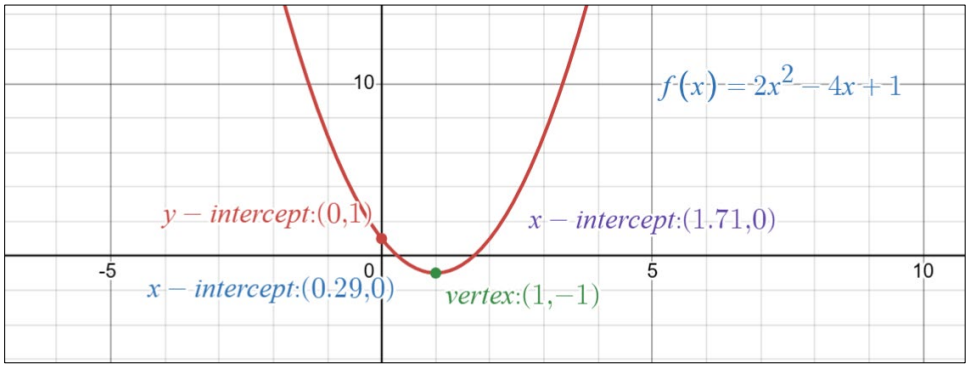
16. a) opens up, vertex $(1,\ -1)$, axis of symmetry $x=1$

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

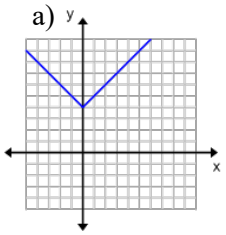


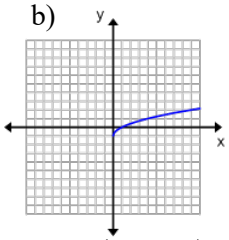
b) opens up, vertex $(1,\ -1)$, axis of symmetry

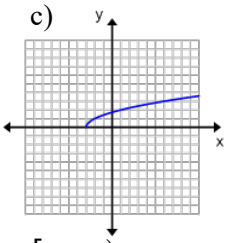
$x\ =1,\ y-int\ (0,\ 1),\ x-int\ (0.29,\ 0),(1.71,\ 0)$

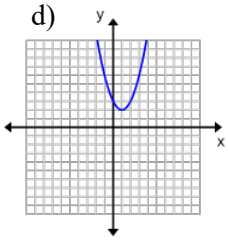


17.

a) 

b) 

c) 

d) 

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: $[-3,\ \infty)$ [-3, ∞), Range: $[0,\ \infty)$

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

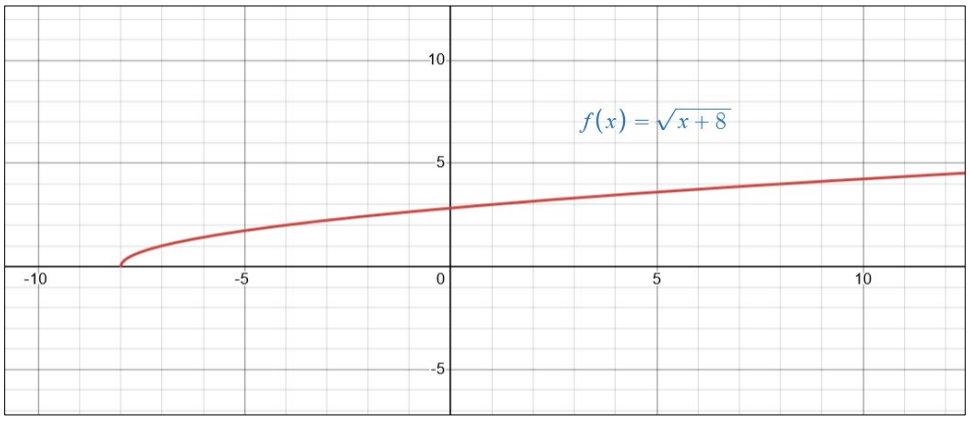
18. NO, it does not pass the vertical line test.

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

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

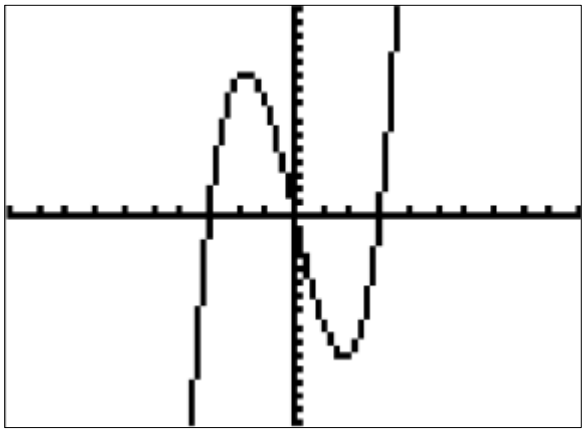
c) $x=-3,\ 2,\ 4$

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



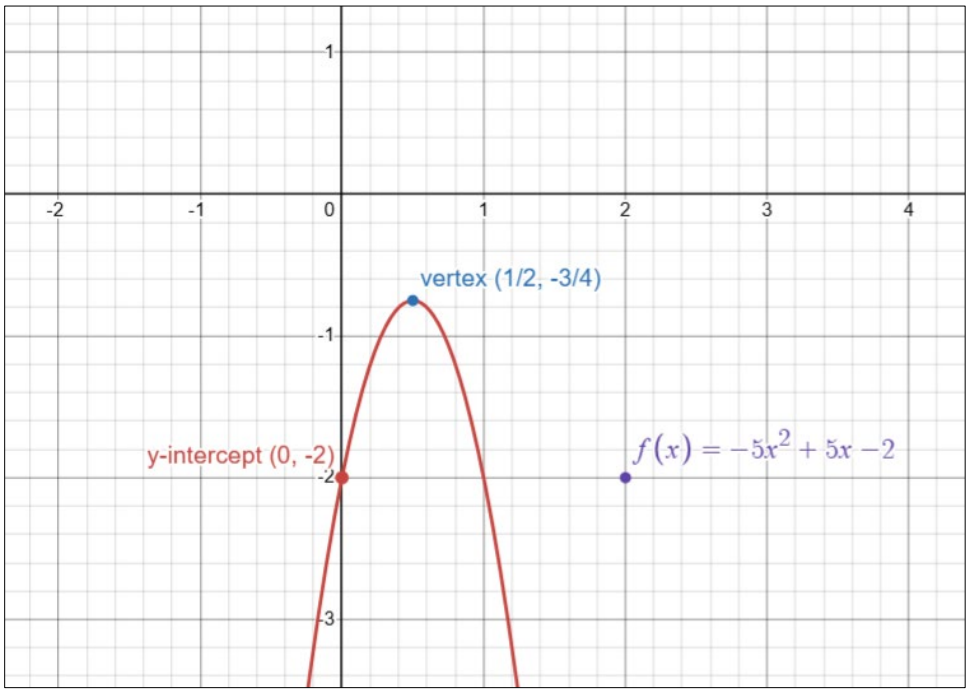
21. a) local max $(-1.73,\ 10.39)$, local min $(1.73,\ -10.39)$

b) f is increasing on $(-\infty,\ -1.73)$ and on $(1.73,\ \infty)$ f is decreasing on $(-1.73,\ 1.73)$

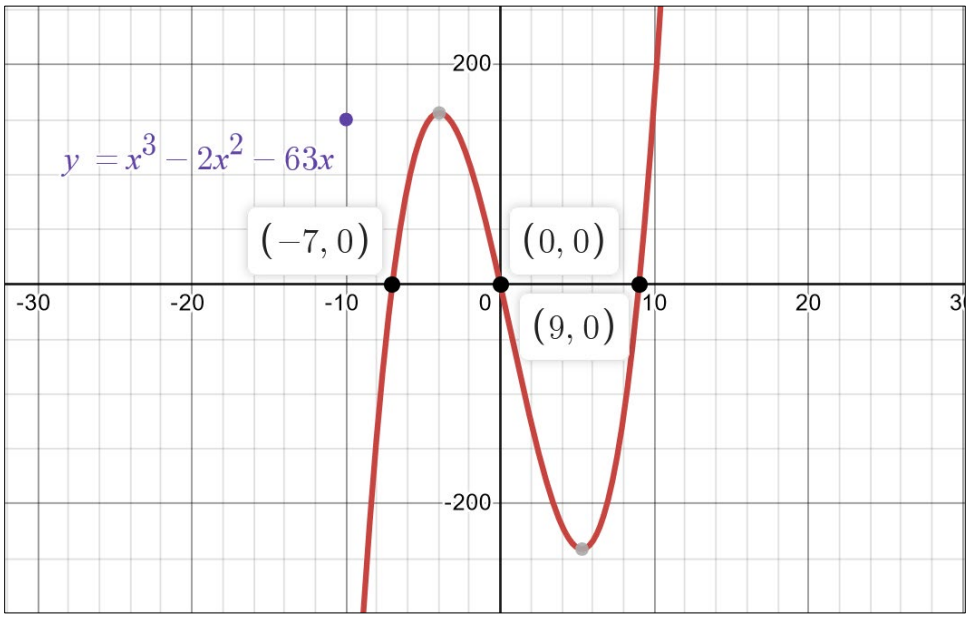


22. opens down, Vertex $\left(\frac{1}{2},-\frac{3}{4}\right)$, $y-int\ (0,-2)$; there are not any $x-$intercepts;

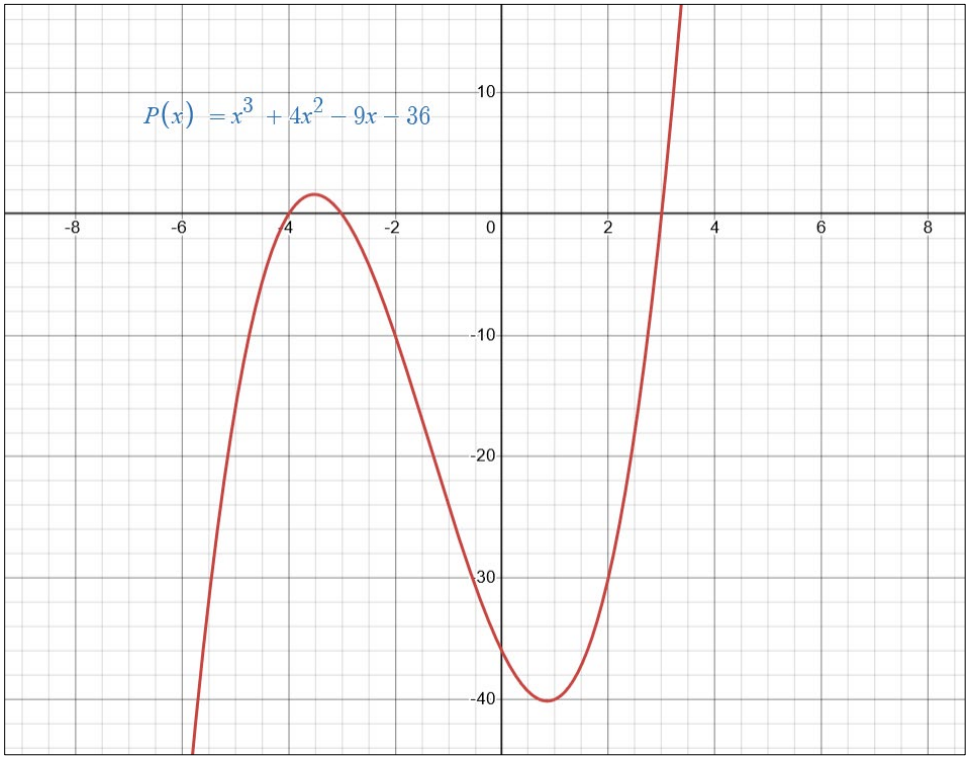
axis of symmetry $x=\frac{1}{2}$



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



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



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

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

26. $x-int\ (-5,\ 0)$ and $(4,\ 0)$ $y-int\ (\text{none})$

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

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. $x=1$

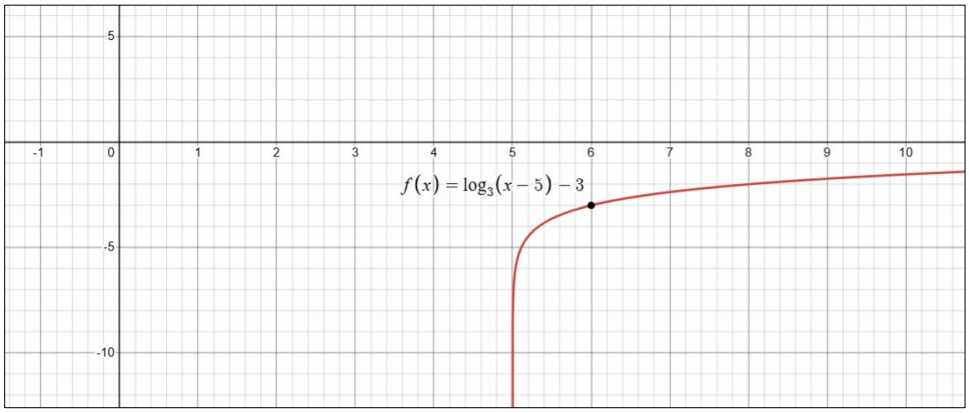
30. a) 8 unit shift to the left
    b) 8 unit shift up

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) $x-int\ (-2,0)\ (2,0), y-int\ (0,2)$

c) 3

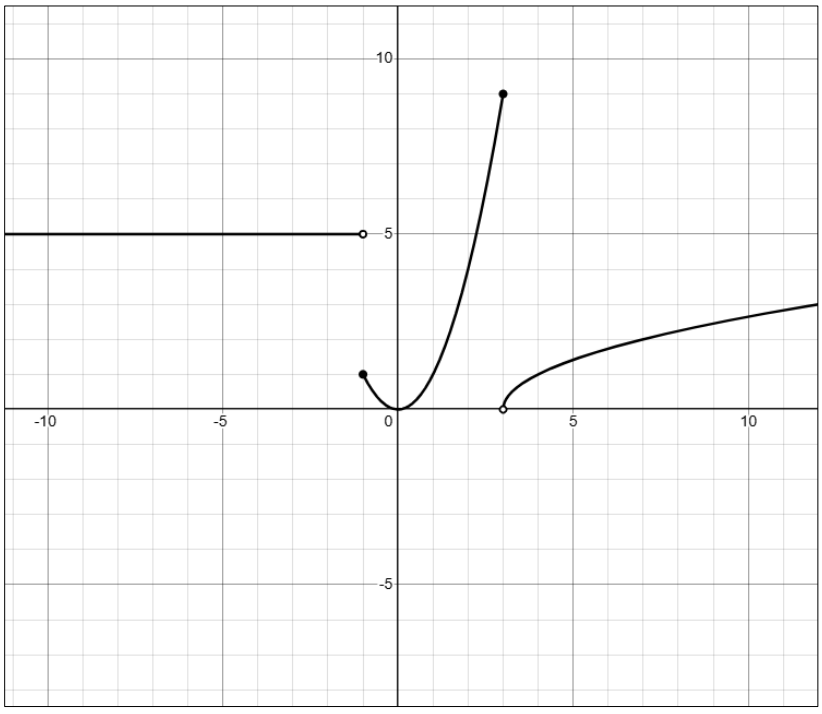
d) $x=-5, 3$

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

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

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

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



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

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

50. Domain: $\{x \mid x \le -10 \text{ or } x \ge 10\}$

51. $[0,6]$

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

    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:$\left[\dfrac{-1}{3},\infty\right)$

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

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

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

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

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

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

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

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

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

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

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

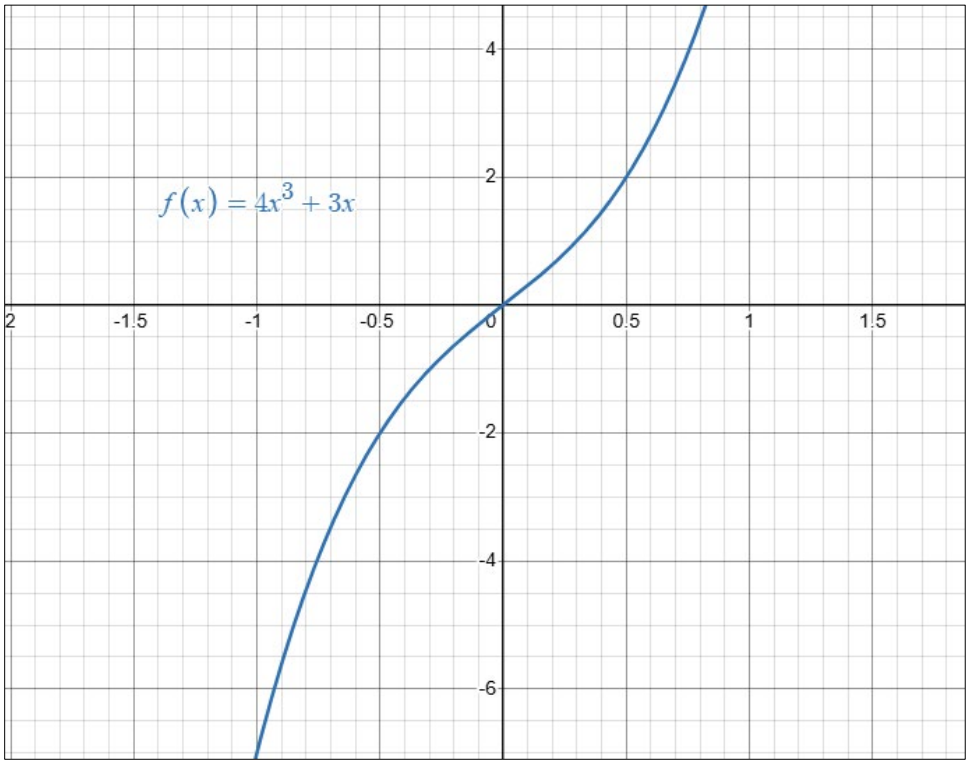
d) Domain of inverse: $\{x \mid x \text{ is any real number except } 0\}$

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

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

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

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. $\dfrac{4}{5}$

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

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. $\frac{2}{3}$