Math 1200 Final Exam Solutions

Originally created by Goenner, last updated 04.8.2024

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

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

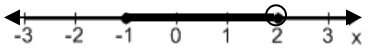
3. m=2, $-\frac{3}{2}$

4. b=0, 3

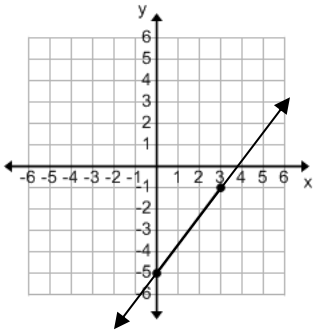
5. x= $2\pm\sqrt{2}$

6. x=-1, 0.5, 1

7. $\{2>x\geq -1\}$



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



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

10. minimum (-.5, .75)

11. 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 {xl x is in the set of all real numbers} OR (-∞, ∞);

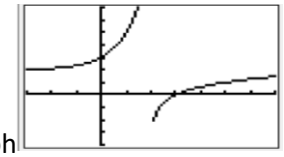
Range {xl x >2} OR $(2,\infty)$;

Horizontal Asymptote y =2

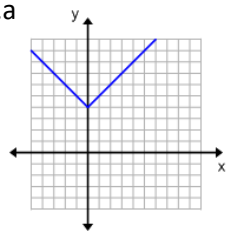
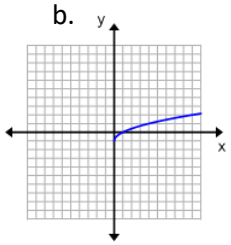
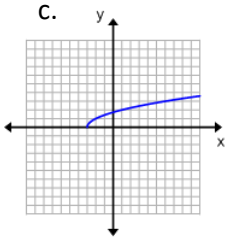
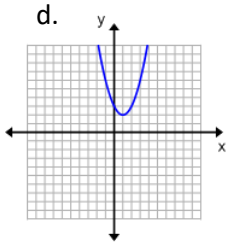
b. Domain {xl x >2} OR $(2,\infty)$;

Range {yl y is in the set of all real numbers} OR (-∞, ∞);

Vertical Asymptote x =2

c. Graph 

16. opens up, vertex (1, -1), axis of symmetry x =1, y-int (0, 1), x-int (1.71, 0) (.29, 0)

17.a  b.  c.  d. 

a) y-int: (0, 4), Domain: (-∞, ∞), Range: [4, ∞)

b), x-int: (1,0), y-int: (0, -1), Domain: [0, ∞), Range: [-1, ∞)

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

d) y-int: (0, 3), Domain: (-∞, ∞), Range: [2, ∞)

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

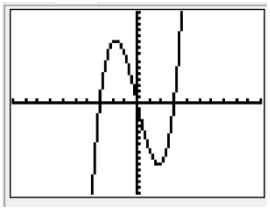
19. a. h(-2) =2, h(0) =0, h(2)=4, h(3)=5

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 (-∞, -1.73) and on (1.73, ∞) f is decreasing on (-1.73, 1.73)

22. local max (-1.63, 8.71), local min (1.63, -8.71)

23. x = 0, -7, 9

24. x=-4, -3, 3

25. x-int (-1, 0), y-int (0, -1/2)

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

27. x-int (-7/3, 0) y-int (0, -3.5), vertical asymptote x=-2/7

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

29. x=1

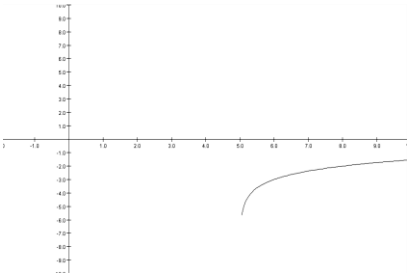
30.a. 8 unit shift to the left.

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

37. x=-3

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

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

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

41. 2/5

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

43. P=2L + 2W

44. 6 2/3 pounds of the $8 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) and (2, 5]

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

47. D:{xl x is any real number except -1}

48. D:{xl x is any real number except 5 and -6}

49. D: {xl $x \le -10$ or $x \ge 10$ }

50. $[0, 6]$

51. a. $f(g(x)) = \frac{2x+7}{2x+3}$, D:{xl x is any real number except -3/2)

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

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

52. a. $\sqrt{11}$

b. 1

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

d. 19

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

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

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

$\left(\frac{f}{g}\right)(x) = \frac{3x^2 + x + 1}{3x}$ D: {x|x is any real number except 0}; R: $(-\infty, -0.82] \cup [1.49, \infty)$

54. $(f+g)(x) = \frac{4x-9}{x(x-3)}$ D: $(-\infty, 0) U (0, 3) U (3, \infty)$ R: $(-\infty, \infty)$

$(f-g)(x)=\dfrac{-2x+9}{x(x-3)}$ D:{x|x is any real number except 0 and 3} R: $(-\infty,-2.49]U[-.18,\infty)$

$(f\cdot g)(x)=\dfrac{3}{x(x-3)}$ D:{x|x is any real number except 0 and 3} R: $(-\infty,-1.33]U(0,\infty)$

$\left(\dfrac{f}{g}\right)(x)=\dfrac{x}{3(x-3)}$ D:{x|x is any real number except 0 and 3} R: $\left(-\infty,\dfrac{1}{3}\right)\cup\left(\dfrac{1}{3},\infty\right)$

55. Domain of f: {x|x is any real number except 5/3} Range of f: {y|y is any real number except 0} $f^{-1}(x)=\dfrac{2+5x}{3x}$

Domain of inverse: {x|x is any real number except 0}Range of inverse:{y|y is any real number except 5/3}

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

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.

60. 3 and -1

61. 4/5

62. 2, -1/3

63. -7

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

65. 5

66. 1

67. -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. $\dfrac{1\pm\sqrt{13}}{2}$

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

77. $2\sqrt{6}$

78. a. 6 grams

b. 4.677 grams

c. 5 days

79. a. $5402.28

b. $6711.69

c. 10 years

80. $8374.84

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 Sol'n

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

104. (-10, 8, -2)

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

106. No sol'n

107. 8,9,10,11 and 107

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

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

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

111. 55

112. 8

113. 380

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

115. $a_n = 6 + 2(n-1)$, 24

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

117. 105

118. 1410

119. 2/3