Math 1200 Final Exam Solutions

Originally created by Goenner, last updated 04.28.2022

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

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

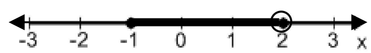
3. m=2, $-\frac{3}{2}$

4. b=0, 3

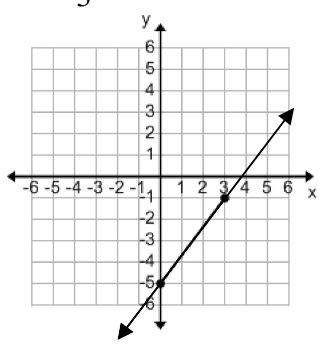
5. x= $2\pm\sqrt{2}$

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 (-∞, ∞);

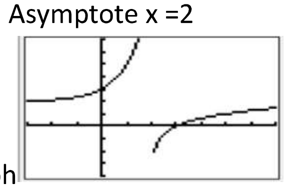
Range {xl x >2} OR $(2,\infty)$;

Horizontal Asymptote y =2

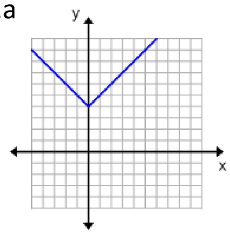
b. Domain {xl x >2} OR $(2,\infty)$;

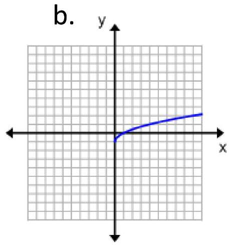
Range {yl y is in the set of all real numbers} OR (-∞, ∞);

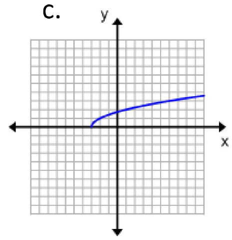
Vertical Asymptote x =2

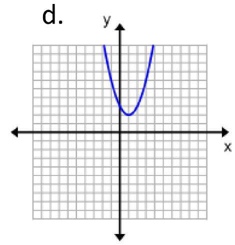
c. Graph 

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.

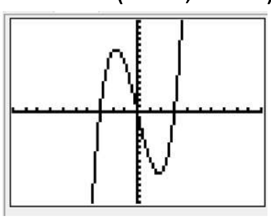
19. a. h(-2) =2, h(0) =0, h(2)=4, h(3)=5

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

c. x=-3, 2, 4

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

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, Horizontal y=-3/7

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

29. x=1

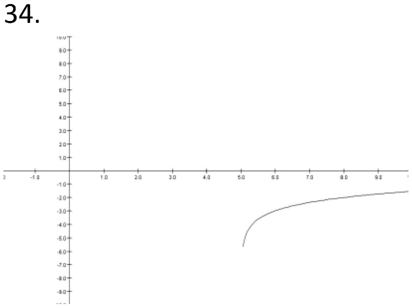
30.a. 8 unit shift to the left.

b. 8 unit shift up.

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

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

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

34.


35. $(x-3)^2+(y-4)^2=16$

36. $x^2+y^2=82$

37. $(x-3)^2+(y-3)^2=9$

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

39. x=-3

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

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

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

43. 2/5

44. $50,000 in A Bonds and $20,000 in CDs.

45. P=2L + 2W

46. 6 2/3 pounds of the $8 per pound coffee.

47. 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]

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

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

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

51. D: {xl $x\le-10$ or $x\ge10$ }

52. $[0,6]$

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

54. a. $\sqrt{11}$

b. 1

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

d. 19

55. $(f+g)(x)=3x^2+4x+1$ 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: $(-\infty,-0.82]\cup[1.49,\infty)$

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

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

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

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

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

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

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

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

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

61. Yes, each x has exactly one y and each y has exactly one x.

62. a. 3 and -1

b. $(-\infty,-1)U(3,\infty)$

63. 4/5

64. 2, -1/3

65. -7

66. $125^{\frac{1}{3}}=5$

67. 5

68. 1

69. -3/2

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

71. a. 3

b. 2

c. 1

72. 4

73. 625

74. a. π

b. 40

c. 90

75. a. 16

b. -1

76. $-\ln(2)$

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

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

79. $2\sqrt{6}$

80. a. 6 grams

b. 4.677 grams

c. 5 days

81. a. $5402.28

b. $6711.69

c. 10 years

82. $8374.84

83. a. 49

b. 64

84. a. $(1,\infty)$

b. $f^{-1}(x)=6^{4^x}$

85. 3

86. $8\log_a(x)-\log_a(y)-9\log_a(z)$

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

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

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

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

91. 1.130930

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

93. -6.4895

94. ln(4)

95. 9, -9

96. 109

97. 20

98. 6

99. 9

100. a. 384 million

b. 299 million

101. a. 46.2 grams

b. 35.7 days

c. 25.2 days

102. a. 206 degrees

b. 150.13 degrees

c. 27.45 minutes

103. x=2, y=1 or (2, 1)

104. No Sol'n

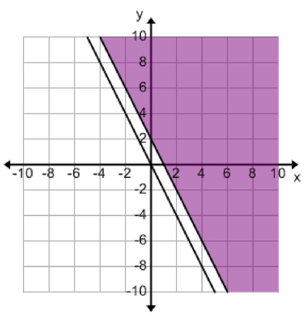
105. Infinite Sol'ns $\left(x, \frac{1}{5}x + 4\right)$

106. (-10, 8, -2)

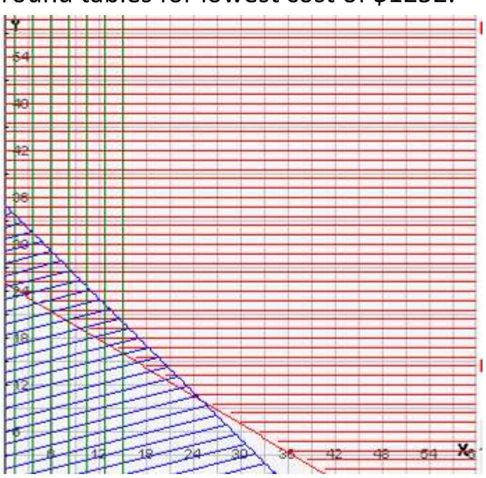
107. Infinite Solutions (26-3z, -11+2z, z) Z is any real number.

108. No sol'n

109.



110. Vertices of the feasible region: (15, 20), (15, 16), (0, 25), (0, 35). They should have 15 rectangular tables and 16 round tables for lowest cost of $1252.



111. 8,9,10,11 and 107

112. 5, 4, 0, -16, -80

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

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

115. 55

116. 8

117. 380

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

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

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

121. 105
122. 1410
123. 2/3
124. $x^6 - 12x^5 + 60x^4 - 160x^3 + 240x^2 - 192x + 64$
125. $32x^5 + 240x^4 + 720x^3 + 1080x^2 + 810x + 243$
126. 24 arrangements
127. 120 tests
128. 40 outfits
129. 0.0000000083
130. $T = k \cdot \sqrt[3]{x} \cdot d^2$