(1-7) State the domain for each of the following:

1. $y = x$ 2. $y = \frac{1}{x}$ 3. $y = \frac{1}{(x-1)}$ 4. $y = \sqrt{x-2}$ 5. $y = \frac{1}{(x^2+1)}$

6. $y = 5$ 7. $y = \frac{(x-1)}{2}$

(8-11) Given: $f(x) = \frac{3}{4}x + 3$, $g(x) = \frac{5}{2}x - 5$ Find:

8. $f[g(x)]$ 9. $g[f(x)]$ 10. $f[f(x)]$ 11. $g[g(X)]$

(12-14) Find $f^{-1}(x)$ when

12. $f(x) = 5x - 1$ 13. $f(x) = \frac{1}{2}x + 3$ 14. $f(x) = 3$

(15-18) Graph:

15. $|2x+5| > 9$ 16. $3 \le |x-2| < 5$ 17. $y = |x| - 1$ 18. $y = |x-3| - 5$

Study F pg. 163 Example 3

19. Graph the solution set, find the coordinates of the vertices, evaluate the decision expression and find the maximums and minimums of the system.

$2 \le x \le 4$ $3x - 2y$

$y \ge 1$

$y \le -x + 7$

(20-24) Write the equations of the following lines.

20. Contains (5,8) and parallel to $y = 7x - 6$

21. Horizontal line thru (-8,9)

22. Vertical line thru (11,-13)

23. Contains (3,-2) and $\perp$ to $2x + 5y = 7$

24. Contains (6,4) and $\perp$ to the line determined by (-5,3) and (2,4)

25. Given lines A,B,C,D below. Find all lines among them that are parallel and $\perp$.

A: $y=\frac{2}{3}x-4$ B: $2x+3y=12$ C: $3y-2x=6$ D: $y-5=-\frac{3}{2}(x+1)$

(26-28) Solve the system

26.
$$9x-7y=5$$
$$10x+3y=-16$$

27.
$$6x-7y=47$$
$$2x+5y=-21$$

28.
$$3x+2y-z=10$$
$$x+4y+2z=3$$
$$2x+3y-5z=23$$

29. Find the determinant: $\begin{vmatrix} 5 & 1 & -1 \\ 2 & 3 & -1 \\ 4 & 2 & 3 \end{vmatrix}$

(30-32) Graph each of the following by finding vertex, roots, and y-intercept

30. $y=x^2-6x+8$ 31. $y=-x^2-2x+3$ 32. $y=-4x^2+4x-1$

(33-35) Write an equation of a quadratic with the given roots.

33. -3 and -6 34. $2+i$ and $2-i$ 35. $4+\sqrt{7}$ and $4-\sqrt{7}$

36. Write the equation of the following mathematical model, graph and state what d and t axis intercepts mean in the problem.

Given t = time and d = distance. A football is punted into the air so that when it is kicked it is 4 feet above the ground, after 1 second it is 28 feet above the ground and 2 seconds later it's 20 feet above.

(37-39) Graph each of the following by finding possible rational roots and the Remainder and Factor Theorem. State the exact nature of roots.

37. $y=x^3-7x^2+11x+3$ 38. $y=2x^3+4x^2-17x-39$ 39. $y=x^4-x^3-11x^2+9x+18$

Study the beam deflection problem on pg. 550 of your text.

(40-49) Simplify the following expressions:

40. $7\sqrt{3}-\frac{12}{3}+\sqrt{75}$ 41. $(2\sqrt{5}-3)^2$ 42. $\frac{2}{\sqrt[3]{9}}$ 43. $\frac{7}{\sqrt[4]{49}}$

44. $\frac{4}{\sqrt{7}+\sqrt{3}}$ 45. $\frac{1+\frac{1}{\sqrt{3}}}{1-\frac{1}{\sqrt{3}}}$ 46. $\frac{\sqrt{3}-1}{\sqrt{2}-1}$ 47. i^{-30} 48. $\sqrt{(-3)(-12)}$

49. $2\sqrt{-3}+5\sqrt{-27}-7\sqrt{-48}$

(50-53) Given $z_1=2+3i$ and $z_2=4-5i$, find

50. reciprocal of z_1 51. reciprocal of z_2 52. $z_1\cdot z_2$ 53. $\frac{z_1}{z_2}$

(54-60) Solve the following equations.

54. $\sqrt[3]{4x-1}=3$ 55. $\sqrt{x-7}=\sqrt{x}-7$ 56. $\sqrt{x}-\sqrt{7}=\sqrt{x+7}$ 57. $x^2-4x+5=0$

58. $x^2+2x+10=0$ 59. $x^2+4x+7=0$ 60. $x^2-10x+27=0$

(61-78) Simplify the following

61. $-2\cdot 3^4$ 62. $(-2\cdot 3)^4$ 63. $-(2\cdot 3^4)$ 64. $-2\cdot(3^4)$

65. $(5x^{-4})(2x^{-3})$ 66. $\frac{5}{a^{-2}}-\frac{3}{a^{-1}}$ 67. $(4x^{(-\frac{1}{2})})^3+(9x^{(\frac{1}{2})})^{(-\frac{1}{2})}$ 68. $64^{\frac{1}{3}}$

69. $64^{\frac{4}{6}}$ 70. $64^{(-\frac{1}{2})}$ 71. $(-64)^{\frac{2}{3}}$ 72. $-64^{\frac{2}{3}}$ 73. $\sqrt[3]{128}\cdot\sqrt{32}$

74. $\sqrt{8}\cdot\sqrt[4]{32}$ 75. $\log_5 48-\log_5 12+\log_5 4$ 76. $3\log_6 15-\log_6 25$

77. $\log_{12}(\log_9(\log_5(\log_2 32)))$ 78. $(\log_7 5)(\log_3 7)(\log_2 27)(\log_5 2)$

(79-90) Solve

79. $\log_{\frac{1}{2}} x = 4$ 80. $\log_3 \frac{1}{9} = x$ 81. $\log_{\frac{1}{3}} 243 = x$ 82. $\log_x 81 = \frac{4}{3}$

83. $2^x = 3$ 84. $3^x = 9^{(x^2-\frac{1}{2})}$ 85. $9^{3x} = 27^{x-2}$ 86. $4^{(x-1)} = 8^x$

87. $\log n + \log 5 = 1$ 88. $\log_5 x^3 - \log_5 x = 2$ 89. $\log(x-1) + \log(x+2) = \log_6 6$

90. $3\log x = \log 64$

Also see page 303 #1 for real world application

(91-98) Simplify

91. $\frac{x^2-7x+12}{x^2-x-6} + \frac{x^2-16}{x^2+x-2}$ 92. $\frac{(x+5)(x+8)}{5-x} \div (x+8)$ 93. $\frac{x^3-1}{x+1} \cdot \frac{x^2+2x+1}{x^2+x+1}$

94. $\frac{x^4-27x}{x^2-9} + \frac{x^2+3x+9}{x+3}$ 95. $\frac{\frac{1}{x} - \frac{2}{x^2} - \frac{3}{x^3}}{\frac{9}{x} - x}$ 96. $\frac{x^{-2}-y^{-2}}{x^{-1}y^{-1}}$

97. $\frac{1-\frac{4}{x+1}}{1-\frac{2}{x-1}}$ 98. $\frac{6}{2x-3y} - \frac{3}{3y-2x}$

(99-103) Solve

99. $2x^2+7x+5=0$ 100. $x^2 = 2x$ 101. $x^3+2x^2-5x-6=0$

102. $\frac{3}{x-3} + \frac{4}{x-4} = \frac{25}{x^2-7x+12}$ 103. $\frac{1}{1-x} = 1 - \frac{x}{x-1}$

(104-105) Graph, showing all holes and asymptotes.

104. $f(x) = \frac{x^2-4x+3}{x^2-x-6}$ 105. $f(x) = \frac{x^2+2x-15}{x-3}$

(106-107) Solve the following problems: On the exam, you will also need to find k and substitute values.

106. The rate at which you receive heat radiation from a hot sphere such as the sun varies directly with the fourth power of its absolute temperature and its surface area and inversely with the square of your distance from the sphere. Find the general equation.

107. The crushing load of a square wooden post varies directly as the fourth power of its thickness and inversely as the square of its length. Find the general equation.

(108-109) Find the midpoint and the distance between the given points:

108. (1,2) and (7,10)

109. $(3, 2\sqrt{3})$ and $(4, \sqrt{3})$

(110-111) Write an equation of the circle with the given conditions:

1110. center $(3, \frac{7}{2})$, $r = \sqrt{5}$

111. center (7,5), contains (3,-2)

(112-113) Write the equation of the given conic section:

112. Ellipse with minor axis = 6, foci at (4,0) and (-4,0)

113. Hyperbola with intercepts (0,3) and (0,-3) and foci at (0,4) and (0,-4)

(114-116) Given the standard form of a conic section, find the critical points of vertices, foci, center and particular values of minor axis, conjugate axis, directrix, etc. as necessary. Sketch each graph. Use graph paper for these.

114. $49x^2 + 16y^2 + 98x - 64y - 671 = 0$

115. $9x^2 - 4y^2 - 54x - 16y - 79 = 0$

116. $x = \frac{1}{2}y^2 + 3y + 4$

(117-118) Solve the following systems over the set of real numbers.

117. $\begin{cases} x^2 + y^2 = 25 \\ y - x^2 = -5 \end{cases}$

118. $\begin{cases} x^2 - 5y^2 = -44 \\ xy = -24 \end{cases}$

(119-124) Find the indicated information in each of the following:

119. 51st term of 18, 14, 10, ...

120. 10th term of 12, 6, 3

121. S_{40} for the series with $t_1 = 8$, and $t_6 = 38$

122. S_9 for the series with $t_1 = 5$, and $r = -3$

123. Given $t_1 = 42$, $r = -\frac{3}{4}$ in an infinite geometric series, find S.

124. Find the fraction for .567567567...

125. Solve the following problem.

A superball is dropped from a window 20 meters above the ground and rebounds 90% of its previous altitude each time. If the ball continues to bounce until it comes to rest, how far will it have traveled up and down in the process?

126. The following chart shows how much time it takes each eight hour work day to pay one day's worth of taxes. Draw a scatter plot on your calculator. Then find the cubic regression equation for the data. Approximately how many minutes should you expect to work each day to pay taxes in the year 2000?

Year	Minutes
1930	52
1940	89
1950	122
1960	140
1970	152
1980	160
1990	165

127. A card is drawn from a normal 52-card deck.

a. What is the size of the sample space?
b. How many outcomes are there in the event "The card has a number on it"?
c. Calculate P(The card is a five)
d. Calculate P(The card is a five or a six)
e. Calculate P(The card is between, not including, five and ten.)
f. Calculate P(The card is the 7 of clubs)
g. Calculate P(The card is a spade)
h. Calculate P(The card is the ace of hearts or ace of diamonds)

128. An algebra class has 13 girls and 8 boys.

a. In how many ways could you select a boy or a girl to work the homework problems?
b. In how many ways could you select a boy and then another boy to work the assignment?
c. In how many ways could you select a girl and a boy to do the assignment?

129. How many different permutations can be made on the word ENTRANCE?

130. A holiday catalog arrive with a selection of 950 gifts. You decide to select 4 of them. How many different selections could you make?

131. The probability that the ceiling fan in Jack's room will work is .95, while the probability that the ceiling fan in Jill's room will work is .86. What is the probability that

a. neither will work?
b. both will work?
c. Either both will work or neither will work?
d. Exactly one will work?