7. List the intercepts of the following graph.

8. Graph \( y = -x^2 + 15 \) using a graphing utility. Create a table of values to determine a good initial viewing window. Use the graphing utility to approximate the intercepts.

In Problems 9–14, determine the intercepts and graph each equation by hand by plotting points. Verify your results using a graphing utility. Label the intercepts on the graph.

9. \( 2x - 3y = 6 \)  
10. \( x + 2y = 4 \)  
11. \( y = x^2 - 9 \)  
12. \( y = x^2 + 4 \)  
13. \( x^2 + 2y = 16 \)  
14. \( 2x^2 - 4y = 24 \)

In Problems 15–22, test each equation for symmetry with respect to the x-axis, the y-axis, and the origin.

15. \( 2x = 3y^2 \)  
16. \( y = 5x \)  
17. \( x^2 + 4y^2 = 16 \)  
18. \( 9x^2 - y^2 = 9 \)  
19. \( y = x^4 + 2x^3 + 1 \)  
20. \( y = x^3 - x \)  
21. \( x^2 + x + y^2 + 2y = 0 \)  
22. \( x^2 + 4x + y^2 - 2y = 0 \)  
23. Sketch a graph of \( y = x^3 \).

24. Sketch a graph of \( y = \sqrt{x} \).

In Problems 25–28, find the standard form of the equation of the circle whose center and radius are given.

25. \( (h, k) = (-2, 3); r = 4 \)  
26. \( (h, k) = (3, 4); r = 4 \)  
27. \( (h, k) = (-1, -2); r = 1 \)  
28. \( (h, k) = (2, -4); r = 2 \)

In Problems 29–32, find the center and radius of each circle. Graph each circle by hand. Determine the intercepts of the graph of each circle.

29. \( x^2 + y^2 - 2x + 4y - 4 = 0 \)  
30. \( x^2 + y^2 + 4x - 4y - 1 = 0 \)  
31. \( 3x^2 + 3y^2 - 6x + 12y = 0 \)  
32. \( 2x^2 + 2y^2 - 4x = 0 \)

33. Show that the points \( A = (3, 4), B = (1, 1), \) and \( C = (-2, 3) \) are the vertices of an isosceles triangle.

34. Show that the points \( A = (1, 5), B = (2, 4), \) and \( C = (-3, 5) \) lie on a circle with center \((-1, 2)\). What is the radius of this circle?

35. The endpoints of the diameter of a circle are \((-3, 2)\) and \((5, -6)\). Find the center and radius of the circle. Write the general equation of this circle.

36. Find two numbers \( y \) such that the distance from \((-3, 2)\) and \((5, y)\) is 10.

In Problems 37 and 38, determine whether each relation represents a function. For each function, state the domain and the range.

37. \{(-1, 0), (2, 3), (4, 0)\}  
38. \{(4, -1), (2, 1), (4, 2)\}

In Problems 39–44, find the following for each function:

(a) \( f(2) \)  
(b) \( f(-2) \)  
(c) \( f(-x) \)  
(d) \( -f(x) \)  
(e) \( f(x - 2) \)  
(f) \( f(2) \)

39. \( f(x) = \frac{3x}{x^2 - 1} \)  
40. \( f(x) = \frac{x^2}{x + 1} \)  
41. \( f(x) = \sqrt{x^2 - 4} \)

42. \( f(x) = |x^2 - 4| \)  
43. \( f(x) = \frac{x^2 - 4}{x^2} \)  
44. \( f(x) = \frac{x^3}{x^2 - 9} \)

In Problems 45–52, find the domain of each function.

45. \( f(x) = \frac{x}{x^2 - 9} \)  
46. \( f(x) = \frac{3x^2}{x - 2} \)  
47. \( f(x) = \sqrt{2 - x} \)  
48. \( f(x) = \sqrt{x + 2} \)

49. \( h(x) = \frac{\sqrt{x}}{|x|} \)  
50. \( g(x) = \frac{|x|}{x} \)  
51. \( f(x) = \frac{x}{x^2 + 2x - 3} \)  
52. \( F(x) = \frac{1}{x^2 - 3x - 4} \)
In Problems 75–78, is the graph shown the graph of a function?
75. [Graph]
76. [Graph]
77. [Graph]
78. [Graph]

In Problems 79–82, sketch the graph of each function. Be sure to label at least three points.
79. \( f(x) = |x| \)
80. \( f(x) = \sqrt{x} \)
81. \( f(x) = \sqrt{x} \)
82. \( f(x) = \frac{1}{x} \)

In Problems 83–94, graph each function using the techniques of shifting, compressing or stretching, and reflections. Identify any intercepts on the graph. State the domain and, based on the graph, find the range.
83. \( F(x) = |x| - 4 \)
84. \( f(x) = |x| + 4 \)
85. \( g(x) = -2|x| \)
86. \( g(x) = \frac{1}{2}|x| \)
87. \( h(x) = \sqrt{x} - 1 \)
88. \( h(x) = \sqrt{x} - 1 \)
89. \( f(x) = \sqrt{1 - x} \)
90. \( f(x) = -\sqrt{x} + 3 \)
91. \( h(x) = (x - 1)^2 + 2 \)
92. \( h(x) = (x + 2)^2 - 3 \)
93. \( g(x) = 3(x - 1)^3 + 1 \)
94. \( g(x) = -2(x + 2)^3 - 8 \)

In Problems 95–98,
(a) Find the domain of each function.
(b) Locate any intercepts.
95. \( f(x) = \begin{cases} 3x & \text{if } -2 < x \leq 1 \\ x + 1 & \text{if } x > 1 \end{cases} \)
96. \( f(x) = \begin{cases} x - 1 & \text{if } -3 < x < 0 \\ 3x - 1 & \text{if } x \geq 0 \end{cases} \)
97. \( f(x) = \begin{cases} x & \text{if } -4 \leq x < 0 \\ 1 & \text{if } x = 0 \\ 3x & \text{if } x > 0 \end{cases} \)
98. \( f(x) = \begin{cases} x^2 & \text{if } -2 \leq x \leq 2 \\ 2x - 1 & \text{if } x > 2 \end{cases} \)
99. A function \( f \) is defined by \( f(x) = \frac{Ax + 5}{6x - 2} \)
If \( f(1) = 4 \), find \( A \).
100. A function \( g \) is defined by \( g(x) = \frac{A}{x} + \frac{8}{x^2} \)
If \( g(-1) = 0 \), find \( A \).

In Problems 101 and 102, (a) verify that the function is one-to-one, and (b) find the inverse of the given function.
101. \( \{(1, 2), (3, 5), (5, 8), (6, 10)\} \)
102. \( \{(-1, 4), (0, 2), (1, 5), (3, 7)\} \)

In Problems 103 and 104, state why the graph of the function is one-to-one. Then draw the graph of the inverse function \( f^{-1} \). For convenience (and as a hint), the graph of \( y = x \) is also given.
103. [Graph]
104. [Graph]

In Problems 105–110, the function \( f \) is one-to-one. Find the inverse of each function and check your answer. Find the domain and range of \( f \) and \( f^{-1} \).
105. \( f(x) = \frac{2x + 3}{5x - 2} \)
106. \( f(x) = \frac{2 - x}{3 + x} \)
107. \( f(x) = \frac{1}{x - 1} \)
108. \( f(x) = \sqrt{x - 2} \)
109. \( f(x) = \frac{3}{x^{1/3}} \)
110. \( f(x) = x^{1/3} + 1 \)