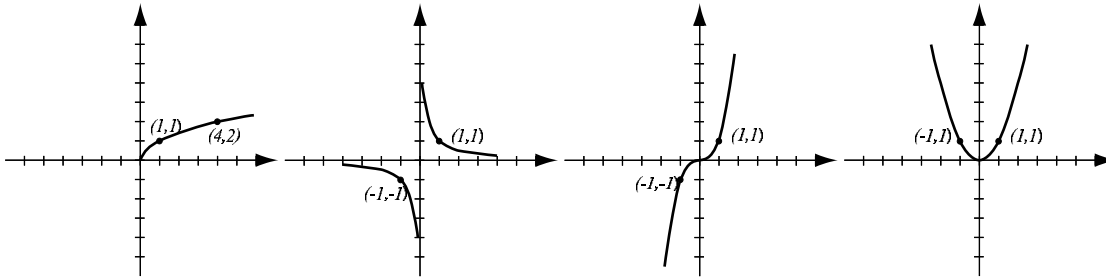**1.** (8pts)   The following are graphs of basic functions.   Write the equation of the graph under each one.

2. (11pts) Solve the inequalities and write the solution using interval notation:

$2x - 3 < 12$ $|x - 3| \geq 5$

3. (8pts) Solve the equation.

$3x^2 - 5x = 2x + 6$

4. (10pts) Solve the equation.

$x^4 - 4x^2 - 21 = 0$

5. (10pts) Use the graph of the function f at right to answer the following questions.
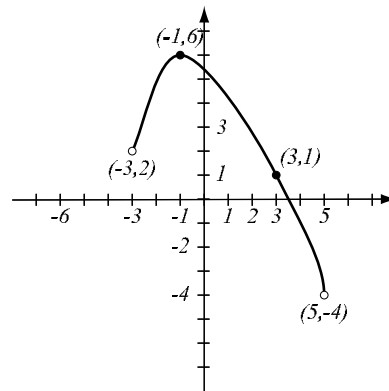
a) What is the domain of f?

b) What is the range of f?

c) Find $f(3)$ and $f(-3)$.

d) What are the solutions
   of the equation $f(x) = -1$?

e) Find all x for which $f(x) \geq 0$.

6. (8pts) Find the equation of the line (in form $y = mx + b$) that is perpendicular to the line $3x - 4y = 7$ and passes through the point $(-1, 1)$.

7. (9pts) Below is an equation of a circle. Find the center and radius of the circle and draw the circle.

$$x^2 + y^2 + 6x - 2y + 6 = 0$$

8. (22pts) Let $f(x) = x^4 - 5x^2 - 9$ (answer with 4 decimal points accuracy).
a) Use your graphing calculator to accurately draw the graph of f (on paper!). Indicate scale on the graph.
b) Determine algebraically whether f is even, odd, or neither. Justify your answer further by examining the graph.
c) Find the x- and y-intercepts.
d) Find where f has a local minimum and maximum.
e) Find the intervals of increase and decrease.

9. (6pts) Find the domain of the function $g(x) = \sqrt{3 - 4x}$.

10. (8pts) Sketch the graph of the piecewise-defined function:

$$f(x) = \begin{cases} 2x - 1, & \text{if } -4 \le x \le 2 \\ -x + 3, & \text{if } 2 < x < 6. \end{cases}$$

Bonus (10pts) Find all points on the line $y = x - 3$ whose distance to the point $(1, 2)$ equals 5. Draw a picture. *(Hint: Set up an equation involving the distance between a generic point (x, y) and the point $(1, 2)$. Then use the fact that the point (x, y) has to be on the line.)*