## WORKSHEET 4

**Problem 1.** Where is the function  $f(x) = \frac{x^2 - 4}{x + 1}$  not differentiable?

**Problem 2.** For each of the following functions, find the equation of the secant line passing through the points where x has the given values.

a) 
$$f(x) = x^2 + 2x, x = 3, x = 5.$$
 b)  $f(x) = 5/x, x = 10, x = 15$ 

**Problem 3.** Use the definition of the derivative to calculate f'(3).

- a) f(x) = 3x 7 b)  $f(x) = -4x^2 + 9x + 2$
- c)  $f(x) = x^2 + 2x + 1$  d)  $f(x) = \frac{12}{x}$
- e)  $f(x) = \sqrt{x}$  f)  $f(x) = \sqrt{2x}$

**Problem 4.** For each of the following functions, calculate the equation of the tangent line passing through the point where x has the given value.

a) 
$$f(x) = x^2 + 2x, x = 3$$
  
b)  $f(x) = 5/x, x = 10$ 

**Problem 5.** The revenue in dollars generated from the sale of x picnic tables is given by  $R(x) = 20x - \frac{x^2}{500}$ .

- a) Find the revenue when 1000 tables are sold.
- b) Find the marginal revenue when 1000 tables are sold.
- c) Estimate the revenue from selling 1001 tables by finding R'(1000).
- d) Determine the actual revenue from selling 1001 tables.
- e) Compare your answers to (c) and (d).

Problem 6. Sketch a graph of the derivative of each of the following functions.

