WS #3-4
The Graph of a Rational Function Variation

1. Reynolds Metal Company manufactures aluminum cans in the shape of a cylinder with a capacity of 500 cubic centimeters. The top and bottom of the can are made of a special aluminum alloy that cost .05¢ per square centimeter. The sides of the can are made of a material that costs .02¢ per square centimeter.
   A. Express the cost of the material for the can as a function of the radius r of the can.
   B. Graph C(r)
   C. What value of r will result in the least cost?
   D. What is the minimum cost?

2. The maximum weight w that can be safely supported by a 2-inch by 4-inch piece of pine varies inversely with its length l. Experiments indicate that the maximum weight that a 10-foot-long pine 2-by-4 can support is 500 pounds.
   A. Write a general formula relating the maximum weight w (in pounds) to the length (in feet).
   B. Find the maximum weight w that can be safely supported by a length of 25 feet.

3. The loss of heat through a wall varies jointly with the area of the wall and the difference between the inside and outside temperatures and varies inversely with the thickness of the wall. Write an equation that relates these quantities.

4. The force of the wind on a flat surface positioned at a right angle to the direction of the wind varies jointly with the area A of the surface and the square of the speed v of the wind. A wind of 30 mph blowing on a window measuring 4 feet by 5 feet has a force of 150 pounds. What is the force on a window measuring 3 feet by 4 feet caused by a wind of 50 mph?