Related Rates

1. Air is being pumped into a spherical balloon so that is volume increases at a rate of 100 cm^3/s. Answer each of the following to find out how fast is the radius of the balloon increasing when the diameter is 50 cm?

   (a) Create some notation for the variables in the above situation. Then write the information you were given in the problem using the language of calculus.

   (b) Find a relationship between the volume of the balloon and its radius. (Geometry you might have forgotten is printed in the front cover of your textbook.)

   (c) Use your work from the above step to find a relationship between the rate of change in volume and the rate of change of the radius.

   (d) How fast is the radius of the balloon increasing when the diameter is 50cm?

verify your answer to number 1 by looking at Example 1 presented in §3.9.

2. A man walks along a straight path at a speed of 4 ft/s. A search light is located on the ground 20ft from the path and is kept focused on the man. At what rate is the search light rotating when the man is 15ft from the point o the path closest to the searchlight?