Class,

Here is the correct solution to problem 16 I attempted to try in class. Serves me right for not drawing a picture.

The questions gives us the information that the change in the volume with respect to time is proportional to the surface area. Therefore, we have the equation:

$$\frac{dV}{dt} = -k(4\pi r^2)$$

We also know from implicit differentiation that the following equation is true:

$$\frac{dV}{dt} = 4\pi r^2 \frac{dr}{dt}$$

This means the following equation is true:

$$\frac{dr}{dt} = -k$$

We know that k equals $\frac{1}{2}$ $cm/month$ based on the information given in the problem. Now we have a differential equation for the radius with respect to time, and solving the equation with a starting value of 1:

$$r = 1 - \frac{t}{2}$$

Solving this equation with the value $r = .2$ gives us the solution of $t = 1.6$.