

Name \_\_\_\_\_ Quiz 3

In the land of Fictoria, the great King Omen has a magic orb. This orb is a sphere in shape and contains a magic liquid that powers King Omen's tremendous magic. The orb has a radius of 10 feet, and the magic liquid is being used (drained) at a rate of  $3 \text{ ft}^3$  per year.

The orb is nearly empty, with the magic liquid reaching only a height of 2 feet above the bottom. See the picture on the projector for reference and note that the volume of this magic liquid can be modeled as a spherical cap with volume given by  $V = \pi r h^2 - \frac{\pi}{3} h^3$ . In this formula  $r$  is the radius of the orb, and  $h$  is the height of the liquid within the orb.

How quickly is the height of the magic liquid decreasing?