

1990 AB4

The radius r of a sphere is increasing at a constant rate of 0.04 centimeters per second.

(Note: The volume of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.)

- (a) At the time when the radius of the sphere is 10 centimeters, what is the rate of increase of its volume?
- (b) At the time when the volume of the sphere is 36π cubic centimeters, what is the rate of increase of the area of a cross section through the center of the sphere?
- (c) At the time when the volume and the radius of the sphere are increasing at the same numerical rate, what is the radius?