Answer on Question #41821 – Physics – Other

the error in radius is 3% what is the error in volume of sphere?

Solution:
We can find the error in volume using differentiation method. For a sphere, the volume is equal to:

$$V = \frac{4}{3}\pi R^3$$

Take log:

$$\log V = 3\log R + \log\left(\frac{4}{3}\pi\right)$$

Differentiate both sides:

$$\frac{dV}{V} = \frac{3dR}{R}$$

If $\frac{dR}{R}$ = 0.03 = 3%, the $\frac{dV}{V}$ is 0.09 or 9%.
Answer: error in volume of sphere is equal to 9%.