RESPOSTAS DA LISTA 09
PROF. MAURÍCIO ZAHN.

01)

$\frac{dV}{dt} = +8\ cm^3/min.$

$V = \frac{4\pi}{3} R^3$. Achar: $\frac{dR}{dt}$ em $R = 2\ cm$

$\frac{dV}{dt} = \frac{4\pi}{3} \cdot 3R^2 \cdot \frac{dR}{dt}$

$\frac{dV}{dt} = 4\pi R^2 \frac{dR}{dt} \Rightarrow \frac{dR}{dt} = \frac{\frac{dV}{dt}}{4\pi R^2} = \frac{8}{4\pi R^2} = \frac{2}{\pi R^2}$

Assim: $\frac{dV}{dt}(R=2cm) = \frac{2}{\pi \cdot (2)^2} = \frac{1}{2\pi}\ cm/min.$

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03) $\frac{dV}{dt} = +10\ m^3/min.$

$h = 2R \Rightarrow R = \frac{h}{2}$

$\frac{dh}{dt}(h=8m) = ?$

$V = \frac{Ab \cdot h}{3} = \frac{\pi R^2 h}{3} = \frac{\pi \cdot \frac{h^2}{4} \cdot h}{3} = \frac{\pi}{12} h^3$

$\Rightarrow \frac{dV}{dt} = \frac{\pi}{12} \cdot 3h^2 \cdot \frac{dh}{dt}$

$\Rightarrow \frac{dV}{dt} = \frac{\pi}{4} \cdot h^2 \cdot \frac{dh}{dt} \Rightarrow \frac{dh}{dt} = \frac{4 \cdot \frac{dV}{dt}}{\pi h^2} = \frac{4 \cdot 10}{\pi h^2} = \frac{40}{\pi h^2}$

Assim:

$\frac{dV}{dt}(h=8m) = \frac{40}{\pi \cdot (8)^2} = \frac{40}{64\pi} = \frac{5}{8\pi}\ m/min.$
