

HW #7

①

6 sides in a cube $\rightarrow S = 6x^2$

$V = x^3$

differentiate $\rightarrow \frac{ds}{dt} = 12x \cdot \frac{dx}{dt}$

plug in $x=2 \rightarrow \frac{ds}{dt} = 24 \frac{dx}{dt}$

plug in $\frac{dx}{dt} = 1/12 \rightarrow \frac{ds}{dt} = 24 \left(\frac{1}{12}\right) = 2 \text{ in}^2/\text{s}$ (Final answer)

plug in $\frac{dv}{dt} = 1 \rightarrow 1 = 12 \frac{dx}{dt}$

$\rightarrow \frac{dx}{dt} = \frac{1}{12}$

②

$\frac{dv}{dt} = 12 \frac{dx}{dt}$ plug in $\frac{dx}{dt} = 1/24 \rightarrow \frac{dv}{dt} = 12 \left(\frac{1}{24}\right) = \frac{1}{2} \text{ in}^3/\text{s}$

$\frac{ds}{dt} = 24 \frac{dx}{dt}$ plug in $\frac{ds}{dt} = 1 \rightarrow 1 = 24 \frac{dx}{dt} \rightarrow \frac{dx}{dt} = \frac{1}{24}$