

SOLUTION TO HW 6

Quantities:

1. x = length of each side of cube

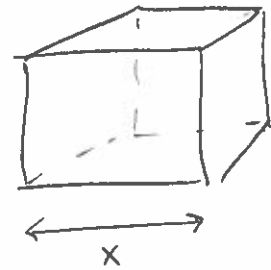
V = volume of cube

A = surface area of cube

Relations:

$$V = x^3, \quad A = 6x^2$$

$$\frac{dV}{dt} = 3x^2 \frac{dx}{dt}, \quad \frac{dA}{dt} = 12x \frac{dx}{dt}$$



a) When $x=2$, what is $\frac{dV}{dt} = ?$

$$\frac{dV}{dt} = 3x^2 \frac{dx}{dt} = 3 \cdot 2^2 \cdot 6 = 12 \cdot 6 = \underline{\underline{72 \text{ cm}^3/\text{s}}}$$

b) When $x=10$, what is $\frac{dV}{dt} = ?$

$$\frac{dV}{dt} = 3 \cdot 10^2 \cdot 6 = \underline{\underline{1800 \text{ cm}^3/\text{s}}}$$

c) When $x=2$, what is $\frac{dA}{dt} = ?$

$$\frac{dA}{dt} = 12 \cdot x \cdot \frac{dx}{dt} = 12 \cdot 2 \cdot 6 = \underline{\underline{144 \text{ cm}^2/\text{s}}}$$

d) When $x=10$, what is $\frac{dA}{dt} = ?$

$$\frac{dA}{dt} = 12 \times \frac{dx}{dt} = 12 \cdot 10 \cdot 6 = \underline{\underline{720 \text{ cm}^2/\text{s}}}$$