

+2/EL

#7. Some Crystals are easy to grow in the shape of cube by allowing a solution of water and sodium chlorate to evaporate slowly.

If V is the volume of such a cube with side length x , calculate $\frac{dV}{dx}$ when $x = 5\text{mm}$ and explain meaning.

• Volume of cube: $V = x^3$

notice $\frac{dV}{dx} = \frac{d}{dx}(x^3)$
↑↑ match!
(power rule)

• Find derivative of V and its length: $\frac{dV}{dx} = 3x^2$

• when $x = 5\text{mm}$: $\frac{dV}{dx} \Big|_{x=5} = 3(5)^2 = 3 \cdot 25 = 75 \text{ mm}^3/\text{mm}$

• As the side length of a cube increase, its volume also increase.
When the length is ~~increasing to~~ 5mm , the volume is increasing at
a rate of $\approx 75 \text{ mm}^3/\text{mm}$
↑ increasing