

Answer on Question 68603, Physics, Other

Question:

A dimension of a cube is increases at the rate of 3 cm/s . When the length of the dimension is 10 cm then what is the rate of increase the volume of cube?

Solution:

Let the length of the dimension of the cube is x . Then, we can write the formula for the volume of the cube:

$$V = x^3.$$

Let's differentiate this equation with respect to the time t :

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

here, $\frac{dV}{dt}$ is the rate of change of the volume of the cube, $\frac{dx}{dt}$ is the rate of the length of the dimension.

Then, we get:

$$\frac{dV}{dt} = 3 \cdot (10 \text{ cm})^2 \cdot 3 \frac{\text{cm}}{\text{s}} = 900 \frac{\text{cm}^3}{\text{s}}.$$

Answer:

$$\frac{dV}{dt} = 900 \frac{\text{cm}^3}{\text{s}}.$$

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