Answer on Question #50586 - Math - Calculus

Question

The amount of water, $V\ cm^3$, in a leaking tank at time t seconds is given by $V(t) = (15-t)^3$ for $0 \le t \le 15$. Find the rate at which the water leaves the tank when $t = 4$.

Solution.

First of all, the rate of changing the amount of water in a leaking tank at time t seconds is the derivative of the amount of water, $V(t)$, with respect to t. To find it, apply the chain rule:

$V'(t) = \left((15-t)^3\right)' = 3(15-t)^2(15-t)' = -3(15-t)^2$.

Then at moment $t = 4$ it would be the following:

$V'(4) = -3(15-4)^2 = -3 \cdot 121 = -363\ cm^3/s$. Thus, it leaves the tank with the rate of $363\ cm^3/s$.

Answer: $363\ cm^3/s$.