Joe is filling up his pool. Water flows out of the hose into a pool at a rate $\rightarrow$derivative modeled by the equation:

$f(x) = 0.7x^3 - 3x + 7$, where x is measured in hours.

If there are 10 gallons of water in the pool when he starts filling it up, how much is in the pool after 5 hours? $\boxed{=116.875}$

$f(x)=0.7x^3-3x+7 = I'(x)$

(0, 10)

(time, Amount)

$\rightarrow$ Amount $= \int$ rate

bounds = 0 to 5

$$A=\int_0^5 .7x^3-3x+7\,dx = \frac{.7x^4}{4}-\frac{3x^2}{2}+7x\Big|_0^5 = \frac{.7(5)^4}{4}-\frac{3(5)^2}{2}+7(5)-\left(\frac{.7(0)^4}{4}-\frac{3(0)^2}{2}+7(0)\right)$$

$$= .7\int_0^5 x^3dx - 3\int_0^5 x\,dx + \int_0^5 7\,dx$$

$$= .7\left(\frac{x^4}{4}\Big|_0^5\right) - 3\left(\frac{x^2}{2}\Big|_0^5\right) + 7x\Big|_0^5 = .7\left(\frac{5^4}{4}-\frac{0^4}{4}\right)-3\left(\frac{5^2}{2}-\frac{0^2}{2}\right)+(7(5)-7(0))$$

= 106.875 gallons

+ 10