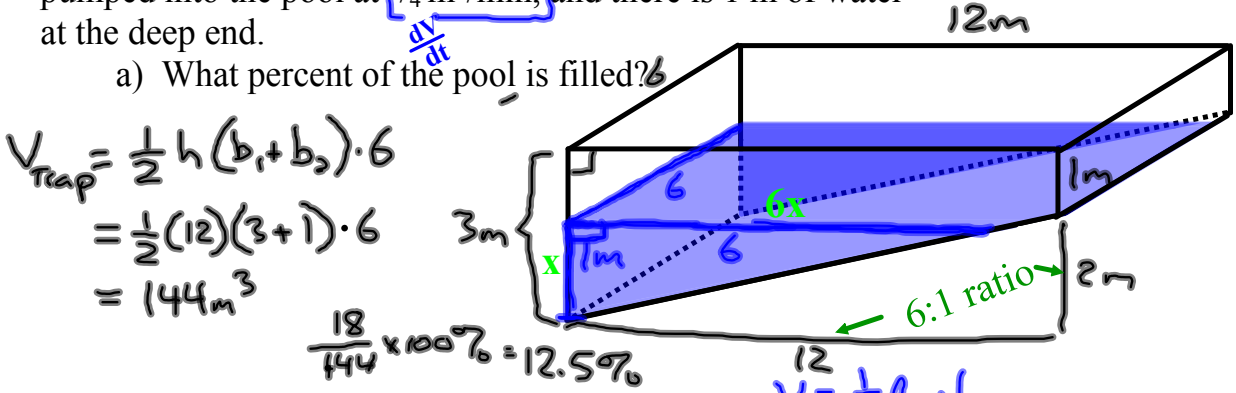
25) A swimming pool is 12 m long, 6 m wide, 1 m deep at the shallow end, and 3 m deep at the deep end. Water is being pumped into the pool at $\frac{1}{4}\ m^3/min$, and there is 1 m of water at the deep end.

$\frac{dV}{dt}$

a) What percent of the pool is filled?



$V_{trap} = \frac{1}{2}h(b_1+b_2)\cdot 6$

$= \frac{1}{2}(12)(3+1)\cdot 6$

$= 144 m^3$

$V = \frac{1}{2}lwh =$

$= \frac{1}{2}(6)(6)(1) = 18 m^3$

$\frac{18}{144} \times 100\% = 12.5\%$

b) At what rate is the water level rising?

Let x = depth of water

$\frac{dx}{dt}$

$V = \frac{1}{2}6(x)(6x)$

$V = 18x^2$

Water is 1m deep

$\frac{dV}{dt} = 36x\frac{dx}{dt}$ $\quad \frac{1}{4} = 36(1)\frac{dx}{dt} = \frac{1}{144} = \frac{dx}{dt}$ $\quad \frac{1}{144}\ m/min$