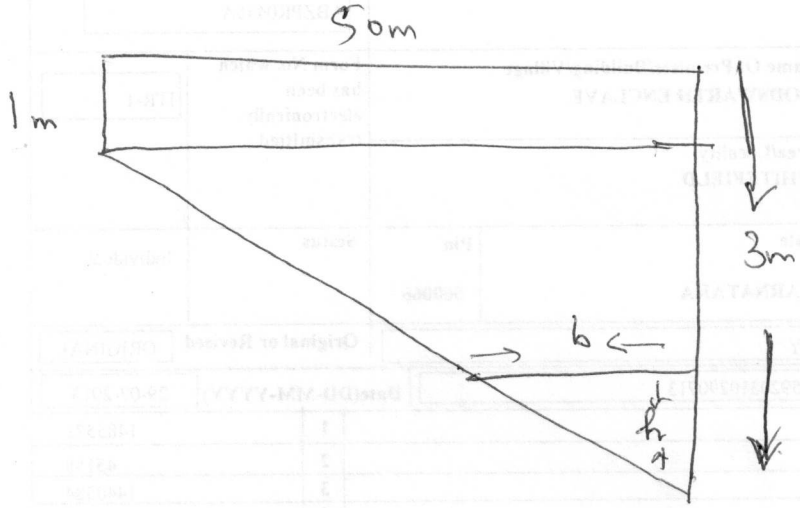
3.10.13



By similar triangles $\frac{2}{50} = \frac{h}{b}$, so $b = 25h$.

$A = \frac{1}{2} bh = 12.5h^2$;

Volume for $0 \leq h \leq 2$ is $V(h) = 12.5h^2 \times 20$
$= 250h^2$.

For $2 < h < 3$, $V(h) = 1000 + 1000h$.

When $t = 250$ min, $V = 250$ m·in $\times 1 m^3/min = 250 m^3$.

So $V(h) = 250h^2 = 250$, $h = 1$ m. At that time $\frac{dV}{dt} = 500h\frac{dh}{dt} = 500 \cdot 1 \cdot \frac{dh}{dt} = 1 m^3/min$.

So $\frac{dh}{dt} = \frac{1}{500} m/min = 2 mm/min$.

Fill time: Volume of swimming pool $= 2000 m^3$, so at $1 m^3/min$, it will take 200 min.