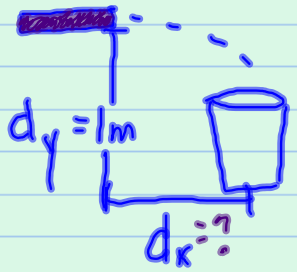
Ex. 9.7 p276

$.025\,m = 2.5\,cm = d$

$60s = 1\,min = t$

$.5\,cm^2$ nozzle $A = 0.5\,cm^2$



① $A = \pi r^2 = \pi\left(\frac{.025}{2}\right)^2 = 4.9\times10^{-4}\,m^2$

Equation of Continuity

$$A_1v_1 = A_2v_2$$

Av - flow rate

$m^2 \cdot \frac{m}{s} = \frac{m^3}{s}$

$Av \quad Av$

$A_1v_1 = A_2v_2$

$4.9\times10^{-4}(1.02) = 0.5\,v_2$

$10\frac{m}{s} = v_2$

find v_1

$$\frac{30\cancel{L}}{60s}\left|\frac{1000\,cm^3}{1\,\cancel{L}}\right|\frac{1^3\,m^3}{100^3\,cm^3}\left|\frac{1}{4.9\times10^{-4}\,m^2}\right. = 1.02\frac{m}{s}$$

$1\,L = 1000\,mL = 1000\,cm^3$

$d_y = -1m \quad d_x = ? \quad t = ?$

$v_{ix} = 10\frac{m}{s} \quad a_y = -9.8\frac{m}{s^2}$

$d_y = \cancel{v_{iy}^{0}}t + \frac{1}{2}a_yt^2$

$$\sqrt{\frac{2d_y}{a_y}} = t$$

$$t = \sqrt{\frac{2(-1)}{-9.8}} = 0.45\,s$$

$d_x = v_{ix}t$

$= 10(0.45) = 4.5m$