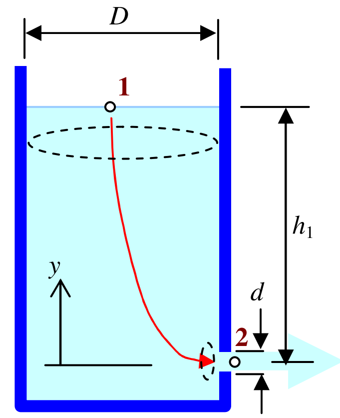

II. Large tank with a hole at the bottom:

$P_1 = P_{atm}$
$P_2 = P_{atm}$ Find V_2
$d = 1cm$
$D = 1m$
$h_1 = 1.5m$

Mass/Continuity: $\dot{m}_2 = \dot{m}_1$

$$\rho A_2 V_2 = \rho A_1 V_1$$

$$\rho \frac{\pi}{4} d^2 V_2 = \rho \frac{\pi}{4} D^2 V_1 \rightarrow V_1 = V_2 \frac{d^2}{D^2}$$

Bernoulli: $P_1 + \rho_1 g h_1 + \frac{1}{2}\rho V_1^2 = P_2 + \rho_2 g h_2 + \frac{1}{2}\rho V_2^2$

$$\rho g h_1 + \frac{1}{2}\rho V_1^2 = \frac{1}{2}\rho V_2^2$$

$$g h_1 + \frac{1}{2} V_2^2 \frac{d^4}{D^4} = \frac{1}{2} V_2^2$$

$$2 g h_1 = V_2^2 \left(1 - \frac{d^4}{D^4}\right)$$

"true" answer

$$V_2 = \sqrt{\frac{2gh_1}{\left(1 - \frac{d^4}{D^4}\right)}} = 5.422176712 \text{ m/s}$$

Note: $\frac{d^4}{D^4} = 1 \times 10^{-8}$, so $\left(1 - \frac{d^4}{D^4}\right) = 0.99999999$.

So, since $d \ll D$, we can reasonably say $V_2 = \sqrt{2gh_1} = 5.422$

Resulting in $V_2 = 5.422176685$ m/s

"approximate" answer that assumes $v_1 \approx$ zero.

You choose.