



Conservation of Mass

$$0 = \frac{d}{dt} \int_{c.v.} \rho dV + \int_{c.s.} \rho (\vec{V} \cdot \vec{n}) dA$$

0
S.S.

$\rho = \text{constant}$ (incompressible)

$$\rightarrow 0 = \rho(-V) \int_{\text{inlet}} dA + \rho \int_0^{1 \text{ ft}} (4y - 2y^2) (3 \text{ ft}) dy$$

$$V (0.75 \text{ ft}) (3 \text{ ft}) = \left[(3 \text{ ft}) \left(\frac{4y^2}{2} - \frac{2y^3}{3} \right) \right]_0^{1 \text{ ft}}$$

$$V = 1.78 \text{ ft/s}$$