

PROBLEM 1.28



$$m = 2 \text{ lb}$$

$$pV^n = \text{constant}$$

$$P_1 = 20 \text{ lbf/in}^2$$

$$V_1 = 10 \text{ ft}^3$$

$$P_2 = 100 \text{ lbf/in}^2$$

$$V_2 = 2.9 \text{ ft}^3$$

$$(a) \quad \left. \begin{array}{l} P_1 V_1^n = \text{constant} \\ P_2 V_2^n = \text{constant} \end{array} \right\} \Rightarrow P_1 V_1^n = P_2 V_2^n$$

$$\Rightarrow \frac{P_1}{P_2} = \left(\frac{V_2}{V_1} \right)^n \quad \text{or} \quad \frac{20}{100} = \left(\frac{2.9}{10} \right)^n$$

$$\text{Solving, } n = 1.3$$

$$(b) \quad v_1 = \frac{V_1}{m} = \frac{10 \text{ ft}^3}{2 \text{ lb}} = 5 \frac{\text{ft}^3}{\text{lb}}, \quad v_2 = \frac{V_2}{m} = \frac{2.9 \text{ ft}^3}{2 \text{ lb}} = 1.45 \frac{\text{ft}^3}{\text{lb}}$$

