

10. The equation of state for an idea gas is  $P V = N k T$ . The temperature is held constant, so the entire right hand side of the equation is constant. This means the product of pressure times volume must be a constant as well, so that we can write

$$P_1 V_1 = P_2 V_2$$

We divide both sides of the equation by  $P_2$  to obtain an expression for  $V_2$ .

$$V_2 = (P_1) (V_1) / P_2$$

$$V_2 = (1000 \text{ N} / \text{m}^2) (2.0 \text{ m}^3) / (3000 \text{ m}^3)$$

$$V_2 = 0.67 \text{ m}^3$$