

40. We divide Eq. 20-35 by Eq. 20-22:

$$\frac{v_P}{v_{\text{rms}}} = \frac{\sqrt{2RT_2/M}}{\sqrt{3RT_1/M}} = \sqrt{\frac{2T_2}{3T_1}}$$

which leads to

$$\frac{T_2}{T_1} = \frac{3}{2} \left(\frac{v_P}{v_{\text{rms}}} \right)^2 = \frac{3}{2} \quad \text{if } v_P = v_{\text{rms}} .$$