

60. We use $P = \frac{1}{2}\mu v\omega^2 y_m^2 \propto v f^2 \propto \sqrt{\tau} f^2$.

(a) If the tension is quadrupled, then

$$P_2 = P_1 \sqrt{\frac{\tau_2}{\tau_1}} = P_1 \sqrt{\frac{4\tau_1}{\tau_1}} = 2P_1 .$$

(b) If the frequency is halved, then

$$P_2 = P_1 \left(\frac{f_2}{f_1} \right)^2 = P_1 \left(\frac{f_1/2}{f_1} \right)^2 = \frac{1}{4} P_1 .$$