

Exercise 9-29

$$\begin{aligned}\text{Initial: } I_1 &= 400 \text{ kg}\cdot\text{m}^2 + (19.0 \text{ kg})(2.00 \text{ m})^2 \\ &= 476 \text{ kg}\cdot\text{m}^2\end{aligned}$$

$$\begin{aligned}\text{Final: } I_2 &= 400 \text{ kg}\cdot\text{m}^2 + (19.0 \text{ kg})(1.00 \text{ m})^2 \\ &= 419 \text{ kg}\cdot\text{m}^2\end{aligned}$$

Angular momentum is conserved  $\therefore I_1 \omega_1 = I_2 \omega_2$

$$\therefore \omega_2 = \frac{I_1}{I_2} \omega_1 = \frac{476}{419} (0.500 \text{ rev/s}) = 0.568 \text{ rev/s}$$