$$\text{Rot KE} = \frac{1}{2}I\omega^2$$

$$\begin{aligned}
\text{Rot KE}_{\text{f}} &= \text{Rot KE}_{\text{i}} + \text{Work}_{\text{net}} \\
\text{Rot KE}_{\text{f}} &= \text{Rot KE}_{\text{i}} + \int \vec{\tau}_{\text{net}} \cdot d\vec{\theta}
\end{aligned}$$

$$W = \int \vec{\tau} \cdot d\vec{\theta}$$

$$\begin{aligned}
\text{power } P &= \frac{dW}{dt} = \frac{d}{dt}\int \vec{\tau} \cdot d\vec{\theta} \\
&= \vec{\tau} \cdot \frac{d\vec{\theta}}{dt} \\
&= \vec{\tau} \cdot \vec{\omega}
\end{aligned}$$

$$\text{Work} = (\text{Power})\,(\text{time})$$