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

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

$$|\tau| = |r|\,|F|\,\sin(\theta)$$

$$\vec{r} = r_x\,\hat{\imath} + r_y\,\hat{\jmath} + r_z\,\hat{k}$$

$$\vec{F} = F_x\,\hat{\imath} + F_y\,\hat{\jmath} + F_z\,\hat{k}$$

$$\vec{r} = 3\,\mathrm{m}\,\hat{\imath} + 0\,\mathrm{m}\hat{\jmath} - 5\,\mathrm{m}\,\hat{k}$$

$$\vec{F} = 6\,\mathrm{N}\,\hat{\imath} + 2\,\mathrm{N}\,\hat{\jmath} + 0\,\mathrm{N}\hat{k}$$

$$5 \times 3 = 15$$

$$\begin{aligned}
\vec{A} &= 5\hat{\imath} + 8\hat{\jmath} \\
\vec{B} &= 1\hat{\imath} - 3\hat{\jmath}
\end{aligned}$$

$$|A \times B| = |A|\,|B|\,\sin(\theta)$$

$$\begin{aligned}
\vec{A} &= 5\hat{\imath} + 8\hat{\jmath} + 0\hat{k} \\
\vec{B} &= 1\hat{\imath} - 3\hat{\jmath} + 0\hat{k}
\end{aligned}$$

$$\begin{aligned}
A \times B &= [(8)(0) - (0)(-3)]\,\hat{\imath} - [(0)(5) - (1)(0)]\,\hat{\jmath} + [(5)(-3) - (8)(1)]\,\hat{k} \\
&= 0\hat{\imath} + 0\hat{\jmath} - 23\hat{k}
\end{aligned}$$

$$\begin{aligned}
\vec{A} &= 1\hat{\imath} + 2\hat{\jmath} + 3\hat{k} \\
\vec{B} &= 3\hat{\imath} + 2\hat{\jmath} + 1\hat{k}
\end{aligned}$$