HW 9-14 Soln)

Use conservation of angular momentum, Li = Lf.

$$I\_{i}ω\_{i}=I\_{f}ω\_{f}$$

The ratio of the kinetic energies is

$$\frac{K\_{f}}{K\_{i}}=\frac{\frac{1}{2}I\_{f}ω\_{f}^{2}}{\frac{1}{2}I\_{i}ω\_{i}^{2}}=\frac{\left(I\_{f}ω\_{f}\right)ω\_{f}}{\left(I\_{i}ω\_{i}\right)ω\_{i}}=\frac{ω\_{f}}{ω\_{i}}=\frac{6}{2}=3$$

This extra energy come from the work the professor does pulling in his arms.