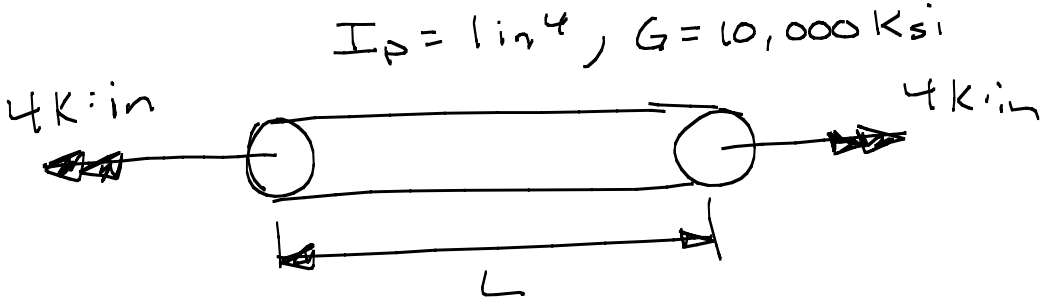
Problem 1

Determine the longest length, L, such that the angle of twist does not exceed 0.5°



$$\phi = \frac{TL}{GI_p} \qquad L = \frac{GI_p\phi}{T}$$

$$L = \frac{(10{,}000\,ksi)(1\,in^4)\left(0.5^\circ \times \frac{\pi\,rad}{180^\circ}\right)}{4\,k\cdot in}$$

$$\boxed{L = 21.8\,in}$$