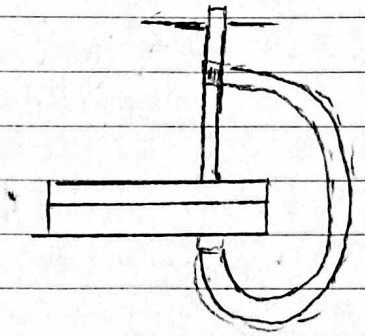
Solutions: 21-5-8.4-MK-01



$F = 100\,lb$

$r = 0.75$

$\ell = 0.25$

$\mu_s = 0.4$

$d = 6\,in$

$$\theta = \tan^{-1}\left(\frac{\ell}{2\pi r}\right) = \tan^{-1}\left(\frac{0.25}{2\pi(0.75)}\right) = 3.03^\circ$$

$$\phi_s = \tan^{-1}(\mu_s) = \tan^{-1}(0.4) = 21.8^\circ$$

$$M = Wr\tan(\phi_s - \theta) = 100\,lb(0.75)\tan(21.8 - 3.03) = 254.88\,lb\cdot in$$

$$F = \frac{254.88}{12} = 21.2\,lb$$