

8. Which "Brady" causes max τ
a) out? b) in?

$$\tau = \vec{r} \times \vec{F} = |\vec{r}| |\vec{F}| \sin \phi \quad \phi = 90^\circ \text{ for all!}$$

$$\tau_1 = (4)(220) = 880 \text{ Nm}$$

$$\tau_2 = (3)(330) = 990 \text{ Nm} \leftarrow \text{max } \tau_{\text{out}}$$

$$\tau_3 = (2)(440) = 880 \text{ Nm}$$

$$\tau_4 = (1)(560) = 560 \text{ Nm}$$

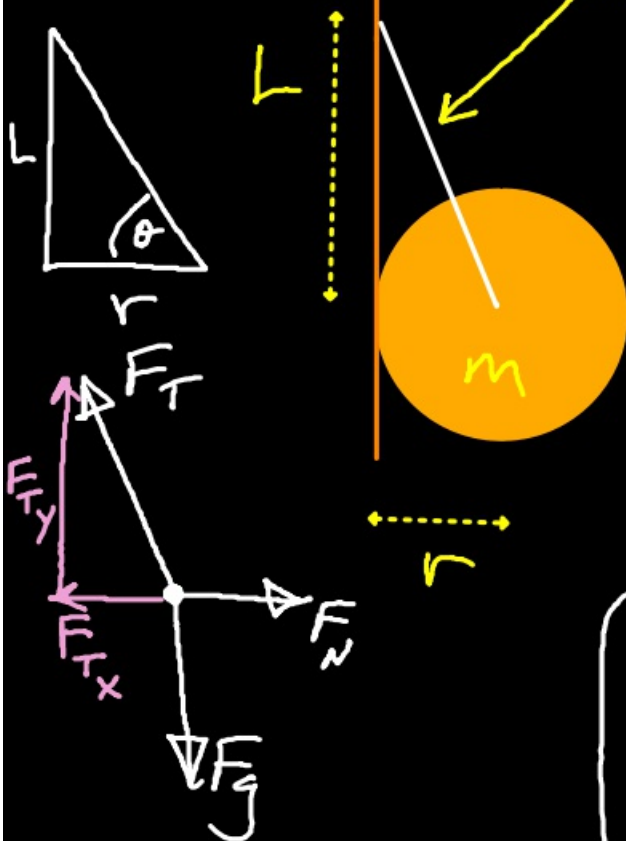
$$\text{max } \tau_{\text{in}} = 7 \quad (990 \text{ Nm in})$$

3.

$$L = 8.0 \text{ cm} \quad r = 4.2 \text{ cm}$$

$$m = 0.85 \text{ kg}$$

$$F_T = ? \quad F_N = ? \text{ (from wall)}$$



$$\Sigma F_y = ma_y \quad a_y = 0$$

$$F_T \sin \theta - mg = 0$$

$$F_T = \frac{mg}{\sin \theta}$$

$$F_T = \frac{(0.85)(9.8)}{\sin 62.3^\circ}$$

$$F_T = 9.41 \text{ N}$$

$$\tan \theta = \frac{L}{r}$$

$$\theta = \tan^{-1}\left(\frac{8}{4.2}\right)$$

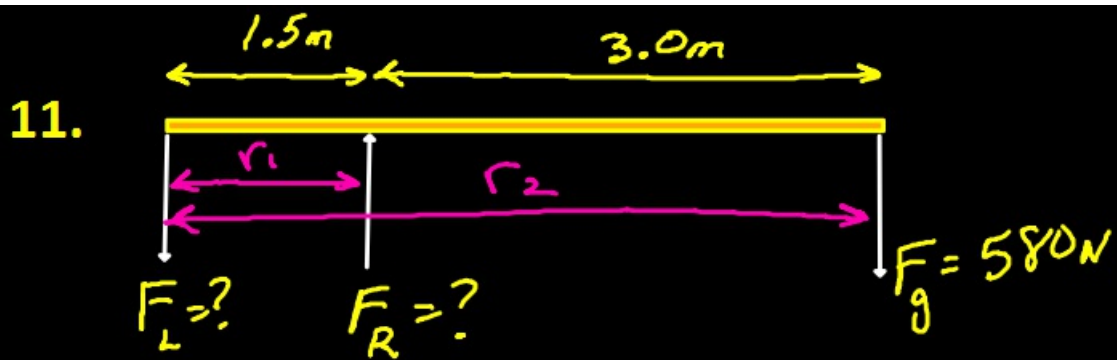
$$\theta = 62.3^\circ$$

$$\Sigma F_x = ma_x \quad (a_x = 0)$$

$$F_N - F_{Tx} = 0$$

$$F_N = 9.41 \cos 62.3^\circ$$

$$F_N = 4.37 \text{ N}$$



$$\Sigma \tau_L = 0 \quad \Sigma \tau = \vec{r} \times \vec{F}$$

$$\vec{r}_1 \times \vec{F}_R - \vec{r}_2 \times \vec{F}_g = 0$$

$$(1.5)(F_R) - (4.5)(580) = 0$$

$$F_R = 1740N \text{ (up)}$$

$$\Sigma F_y = ma_y \quad a_y = 0 \text{ (fine to just say } \Sigma F_y = 0 \text{)}$$

$$-F_L + F_R - F_g = 0$$

$$-F_L + 1740 - 580 = 0$$

$$F_L = 1160N \text{ (down)}$$

Left is stretched, right is
compressed