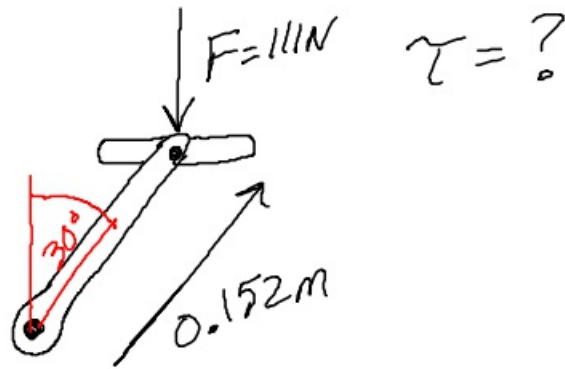


48.

a)



$$\vec{\tau} = \vec{r} \times \vec{F} = (r)(F) \sin \phi$$

$$= (0.152)(111) \sin 30^\circ$$

$$\tau = 8.44 \text{ Nm}$$

(into picture)

b) $\phi = 90^\circ$

$$\tau = (0.152)(111) \sin 90^\circ$$

$$\tau = 16.5 \text{ Nm}$$

(in)

c) $\phi = 0^\circ$ (radius is $\downarrow$ and $F \downarrow$)

$$\tau = 0$$