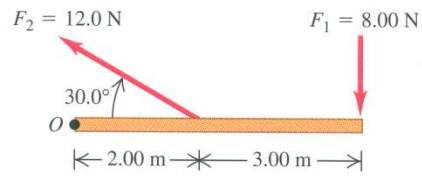


- 10.2. Calculate the net torque about point O for the two forces applied as in the figure. The rod and both forces are in the plane of the page.



Identify: $\tau = Fl$ with $l = r \sin \phi$. Add the two torques to calculate the net torque.

Set Up: Let counterclockwise torques be positive.

Execute: $\tau_1 = -F_1 l_1 = -(8.00\text{ N})(5.00\text{ m}) = -40.0\text{ N}\cdot\text{m}$.

$\tau_2 = +F_2 l_2 = (12.0\text{ N})(2.00\text{ m}) \sin 30.0^\circ = +12.0\text{ N}\cdot\text{m}$. $\sum \tau = \tau_1 + \tau_2 = -28.0\text{ N}\cdot\text{m}$. The net torque is $28.0\text{ N}\cdot\text{m}$, clockwise.

Evaluate: Even though $F_1 < F_2$, the magnitude of τ_1 is greater than the magnitude of τ_2 , because F_1 has a larger moment arm.