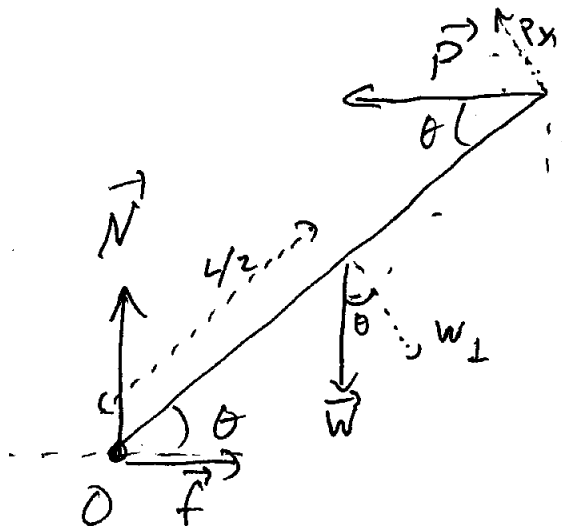


ANALYZING THE LADDER PROBLEM



FOR EQUILIBRIUM

$$\textcircled{1} \quad \Sigma F_x = 0$$

$$\textcircled{2} \quad \Sigma F_y = 0$$

$$\textcircled{3} \quad \Sigma \tau = 0$$

$$\textcircled{1} \quad \Sigma F_x = 0 \Rightarrow \vec{f} - \vec{P} = 0 \Rightarrow f = P$$

$$\textcircled{2} \quad \Sigma F_y = 0 \Rightarrow \vec{N} - \vec{W} = 0 \Rightarrow N = W$$

$$\textcircled{3} \quad \Sigma \tau = 0$$

FIRST, CHOOSE POINT TO SUM TORQUES ABOUT. \Rightarrow SUM ABOUT O (MAKES PROBLEM SIMPLER!)

$$\Rightarrow \tau_w - \tau_p = 0 \Rightarrow \tau_w = \tau_p \quad (\text{RECALL } \tau = r F_{\perp})$$

$$\tau_w = \left(\frac{L}{2}\right) W \cos \theta \quad \tau_p = (L) P \sin \theta$$

$$\Rightarrow \frac{L}{2} W \cos \theta = L P \sin \theta$$

$$\text{SOLVE FOR } P : \quad P = \frac{W \cos \theta}{2 \sin \theta} = \frac{W}{2 \tan \theta}$$