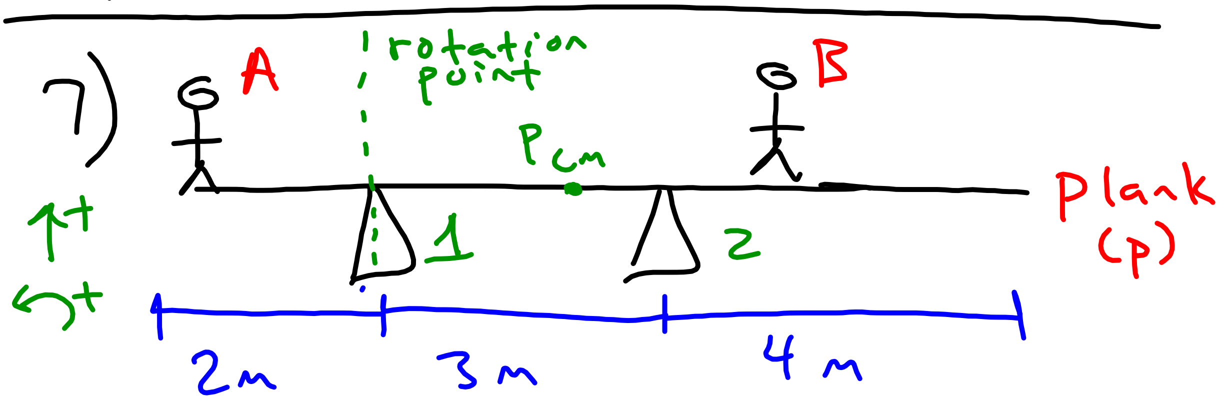
STATIC EQUILIBRIUM

- Net force → $\sum \vec{F} = \emptyset$
  (all directions)
- Net torque → $\sum \vec{\tau} = \emptyset$
- The torque is zero at <u>every</u> point, so use any point that is convenient as the pivot point.

Practice - Rotational Statics

7)



$$\emptyset = \sum \vec{F}_y = F_{N1} + F_{N2} - F_{gA} - F_{gB} - F_{gP}$$

$$\emptyset = \sum \vec{\tau} = r_A F_{gA} - r_p F_{gP} + r_2 F_{N2} - r_B F_{gB}$$

left support is rotation point

* As the board would start to rotate, $F_{N1} = \emptyset$ N.

$$F_{N2} - F_{gA} - F_{gB} - F_{gP} = \emptyset$$

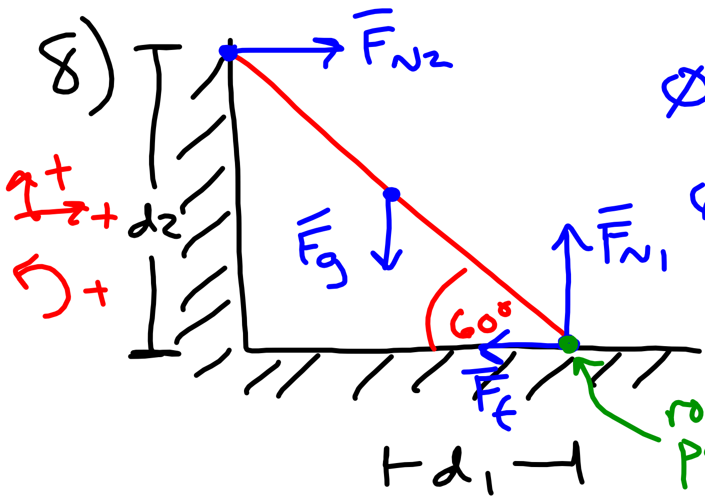
$$F_{N2} - a_g(m_A + m_B + m_p) = \emptyset$$

$$F_{N2} = \boxed{a_g(m_A + m_B + m_p)}$$

$$r_A F_{gA} - r_p F_{gP} + r_2 F_{N2} - \underline{r_B} F_{gB} = \emptyset$$

$$r_B = \frac{1}{F_{gB}}\left[r_A F_{gA} - r_p F_{gP} + r_2 a_g (m_A + m_B + m_P)\right]$$

8)



$$\emptyset = \sum \vec{F}_x = F_{N2} - F_f$$

$$\emptyset = \sum \vec{F}_y = F_{N1} - F_g$$

$$\mu = \frac{F_f}{F_{N1}}$$

$$\emptyset = \sum \vec{\tau} = d_1 F_g - d_2 F_{N2}$$

$$\emptyset = \frac{1}{2}\cancel{L}\cos(60^\circ)\, m a_g - \cancel{L}\sin(60^\circ) F_{N2}$$

$$F_{N2} = \frac{1}{2}\frac{\cos(60^\circ)}{\sin(60^\circ)} m a_g = \frac{m a_g}{2\tan(60^\circ)}$$

$$\mu = \frac{F_f}{F_{N1}} = \frac{\frac{\cancel{m a_g}}{2\tan(60^\circ)}}{\cancel{m a_g}}$$

$$F_f = F_{N2}$$

$$\mu = \frac{1}{2\tan(60^\circ)}$$

$$= 0.29$$