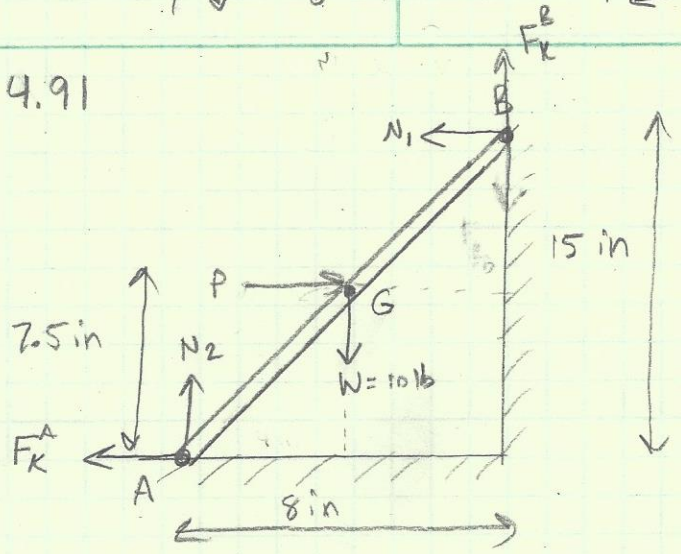
↷+ ↷− | +↑ +→ | N_2 ↷ | F_K^A ↷

P ↷

W ↶

4.91



10 lb rod

$\mu_A = 0.20$

$\mu_B = 0.20$

P = ? for equilibrium

$$\Sigma M_B = N_2\left(\frac{8\text{ in}}{12\text{ in/ft}}\right) + 10\left(\frac{4\text{ in}}{12\text{ in/ft}}\right) - P\left(\frac{7.5\text{ in}}{12\text{ in/ft}}\right) + .20N_1\left(\frac{15\text{ in}}{12\text{ in/ft}}\right) = 0 \text{ ft-lb}$$

$$\Sigma F_y = N_2 + .20N_1 - W = 0 \qquad F_K^B = \mu_B N_1$$

$$\Sigma F_x = N_1 + .20N_2 - P = 0 \qquad \therefore N_2 = W - .20N_1$$

$$P = N_1 + .20N_2$$

$$= N_1 + .20[10 - .20N_1]$$

$$(10 - .20N_1)\left(\frac{8}{12}\right) + 10\left(\frac{4}{12}\right) - \left[N_1 + .20[10 - N_1]\right]\left(\frac{7.5}{12}\right) + .20N_1\left(\frac{15}{12}\right) = 0$$

$$6.67 - 0.133N_1 + 3.33 - 0.625N_1 + 1.25 + 0.125N_1 + 0.25N_1 = 0$$

$$8.75 = -0.383N_1$$

$$N_1 = -22.8 \qquad N_2 = 10 - .20(-22.8)$$

$$N_2 = 5.43 \text{ lb}$$

$$-22.8 + .20(5.43) - P = 0$$