



A bar is held in equilibrium as shown. Find the reactions at the smooth contact points A, B, and C.

$$\Sigma F_x = 0 \rightarrow N_C \sin(30^\circ) - F \sin(\theta_1 + 30^\circ) = 0$$

$$\rightarrow N_C = F \frac{\sin(\theta_1 + 30^\circ)}{\sin(30^\circ)}$$

$$\Sigma M_B = 0 \rightarrow (d_1 + d_2)F \cos(\theta_1) - (0.15 \text{ m})N_A \sin(30^\circ) - d_2 N_C = 0$$

$$\rightarrow N_A = \frac{(d_1 + d_2)F \cos(\theta_1) - d_2 N_C}{(0.15 \text{ m}) \sin(30^\circ)}$$

$$\Sigma F_y = 0 \rightarrow N_B - N_A + N_C \cos(30^\circ) - F \cos(\theta_1 + 30^\circ) = 0$$

$$\rightarrow N_B = N_A + F \cos(\theta_1 + 30^\circ) - N_C \cos(30^\circ)$$