100 lb

— 3 ft — | — 3 ft —

200 lb · ft

A

2 ft

3

5 | 4

13 | 5

B | 12

A bent bar is supported by a smooth collar at A, which freely slides along the inclined bar, and a smooth surface at B. Find the support reactions at point A and B. Ignore the mass of the bent bar.

$$\Sigma F_x = 0 \rightarrow N_A \frac{4}{5} - N_B \frac{5}{13} = 0 \rightarrow N_B = N_A \frac{52}{25}$$

$$\Sigma F_y = 0 \rightarrow N_A \frac{3}{5} + N_B \frac{12}{13} - 100 \text{ lbs} = 0 \rightarrow N_A \left(\frac{3}{5} + \frac{48}{25} \right) = 100 \text{ lbs} \rightarrow N_A = \frac{2500}{63} \text{ lbs}$$

$$\rightarrow N_B = \frac{5200}{63} \text{ lbs}$$

$$\Sigma (M_{System})_A = 0 \rightarrow M_A + N_B \frac{12}{13} (6 \text{ ft}) - N_B \frac{5}{13} (2 \text{ ft}) - 200 \text{ lb} \cdot \text{ft} - (100 \text{ lbs})(3 \text{ ft}) = 0$$

$$\rightarrow M_A = 500 \text{ lb} \cdot \text{ft} - N_B \left(\frac{62}{13} \text{ ft} \right) = 500 \text{ lb} \cdot \text{ft} - \frac{62 \cdot 400}{63} \text{ lb} \cdot \text{ft}$$