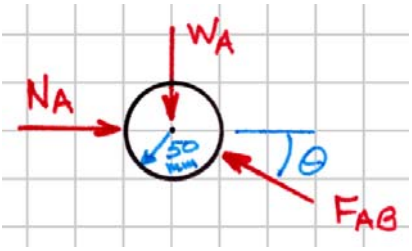
1-44

From a free-body diagram of pipe A, the equations of equilibrium are

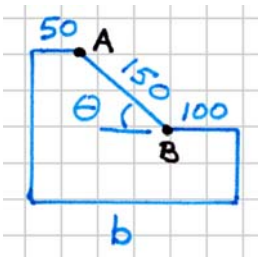


$$\rightarrow \Sigma F_x = 0: \qquad N_A - F_{AB}\sin\theta = 0$$

$$\uparrow \Sigma F_y = 0: \qquad F_{AB}\cos\theta - 5(9.81) = 0$$

where

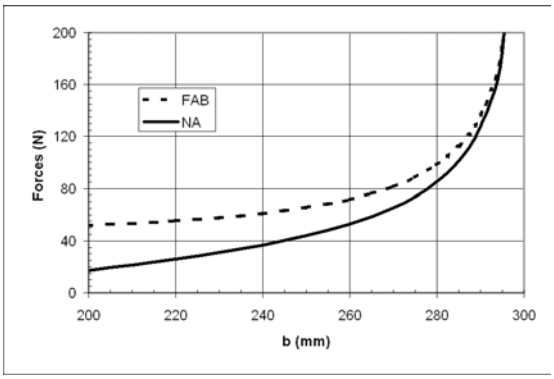
$$\theta = \sin^{-1}\frac{b-150}{150}$$



Therefore

$$F_{AB} = \frac{49.05}{\cos\theta}\ \text{N}$$

$$N_A = F_{AB}\sin\theta\ \text{N}$$



(a) $N_A < 50$ N for $b < 260$ mm ..... **Ans.**

(b) $F_{AB} < 100$ N for $b < 280$ mm ..... **Ans.**

(c) $F_{AB} < 200$ N for $b < 295$ mm ..... **Ans.**