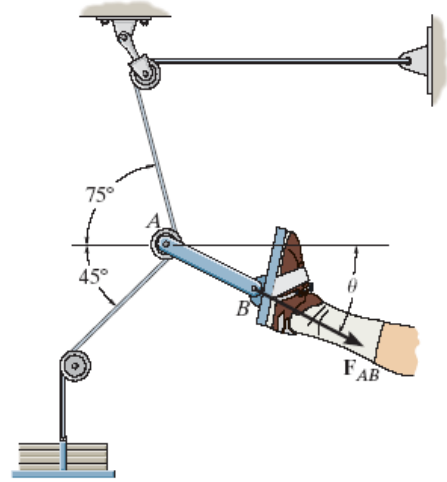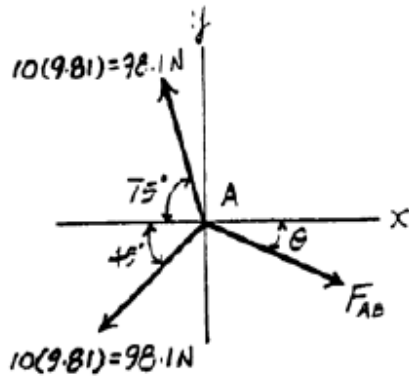*3–32. Determine the magnitude and direction θ of the equilibrium force F_{AB} exerted along link AB by the tractive apparatus shown. The suspended mass is 10 kg. Neglect the size of the pulley at A.

Free Body Diagram : The tension in the cord is the same throughout the cord, that is $10(9.81) = 9.81$ N.

Equations of Equilibrium :

$$\xrightarrow{+} \Sigma F_x = 0; \quad F_{AB}\cos\theta - 98.1\cos 75° - 98.1\cos 45° = 0$$
$$F_{AB}\cos\theta = 94.757 \qquad\qquad [1]$$

$$+\uparrow \Sigma F_y = 0; \quad 98.1\sin 75° - 98.1\sin 45° - F_{AB}\sin\theta = 0$$
$$F_{AB}\sin\theta = 25.390 \qquad\qquad [2]$$

Solving Eqs.[1] and [2] yields

$$\theta = 15.0° \qquad F_{AB} = 98.1 \text{ N} \qquad\qquad \text{Ans}$$