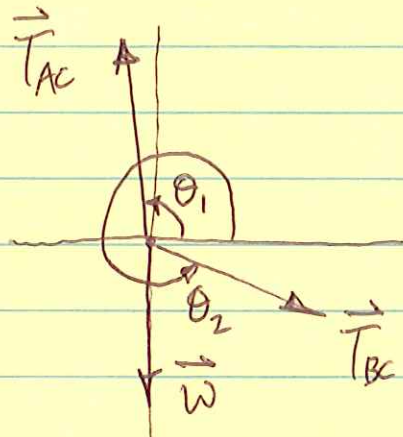PROB. 2.45

$\alpha = 20°$, FIND T_{AC}, T_{BC}

FREE-BODY DIAGRAM OF PIN C:

$\theta_1 = 90 + 5 = 95°$

$\theta_2 = \cancel{\text{000}} 360 - 20 = 340°$

DEFINE VECTORS:

$$\vec{T}_{AC} = (T_{AC} \cos\theta_1)\,\hat{\imath} + (T_{AC} \sin\theta_1)\,\hat{\jmath}$$

$$\vec{T}_{AC} = (-0.0871\,T_{AC})\,\hat{\imath} + (0.996\,T_{AC})\,\hat{\jmath} \quad^{LB}$$

$$\vec{T}_{BC} = (T_{BC} \cos\theta_2)\,\hat{\imath} + (T_{BC} \sin\theta_2)\,\hat{\jmath}$$

$$\vec{T}_{BC} = (0.9397\,T_{BC})\,\hat{\imath} + (-0.342\,T_{BC})\,\hat{\jmath} \quad^{LB}$$

$$\vec{W} = (-1200)\,\hat{\jmath} \quad^{LB}$$

EQUILIBRIUM EQUATIONS:

$$\Sigma F_x = 0, \qquad \Sigma F_y = 0$$

PROB. 2.45 CONT. ②

$\Sigma F_x = 0:$ $-0.0871\ T_{AC} + 0.9397\ T_{BC} = 0$

$T_{AC} = 10.79\ T_{BC}$

$\Sigma F_y = 0:$ $0.996\ T_{AC} - 0.342\ T_{BC} - 1200 = 0$

$0.996\ (10.79\ T_{BC}) - 0.342\ T_{BC} = 1200$

$\underline{T_{BC} = 115.3^{LB}}$

$\underline{T_{AC} = 10.79\ (115.3) = \underline{1244}^{LB}}$