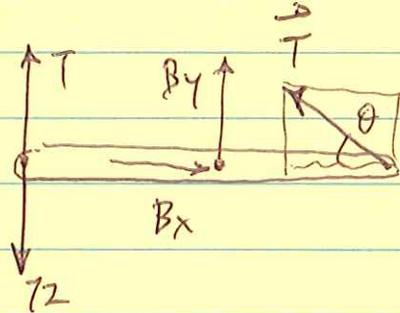


①

PROB. 4.77

FIND  $T$ ,  $\vec{B}$ .

FBD



$$\theta = \tan^{-1}\left(\frac{7}{24}\right) = 16.3^\circ$$

$$\vec{T} = (-T \cos 16.3^\circ) \hat{i} + (T \sin 16.3^\circ) \hat{j}$$

$$\vec{T} = (-0.96T) \hat{i} + (0.281T) \hat{j} \text{ lb}$$

$$\sum F_x = 0: B_x - 0.96T = 0 \Rightarrow B_x = 0.96T$$

$$\sum F_y = 0: B_y + T - 72 + 0.281T = 0$$

$$B_y = -1.28T + 72$$

$$\sum M_B = 0 \uparrow: -(12 \text{ in})T + (12 \text{ in})(72 \text{ lb}) + (12)(0.281T) = 0$$

$$-8.64T = -864 \Rightarrow \underline{T = 100 \text{ lb}}$$

$$B_x = 0.96(100) = 96 \text{ lb}, \quad B_y = -1.28(100) + 72 = -56 \text{ lb}$$

$$\vec{B} = (96) \hat{i} + (-56) \hat{j} \text{ lb}, \quad |\vec{B}| = \sqrt{96^2 + 56^2} = \underline{111.1 \text{ lb}}$$

$$\theta = \tan^{-1}\left(\frac{56}{96}\right) = 30.3^\circ \quad \swarrow$$