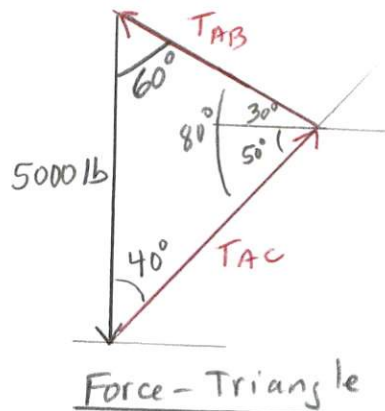
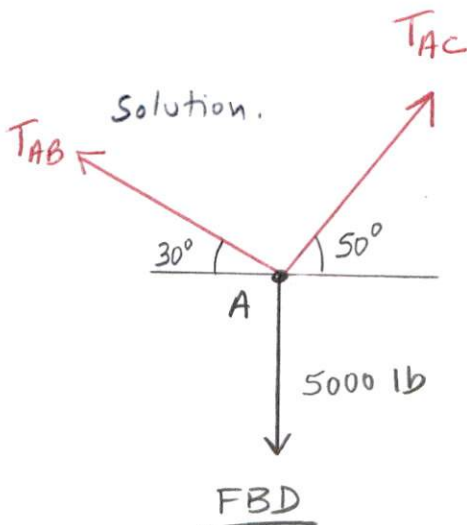
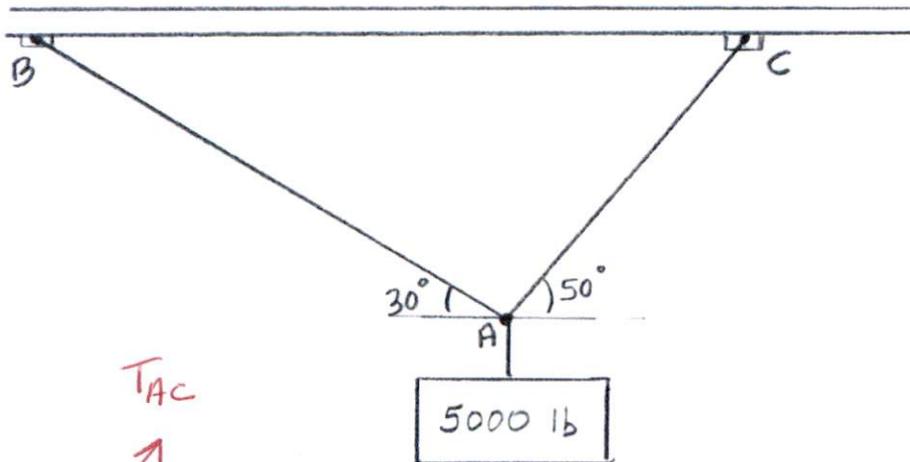


SHOW ALL WORK FOR FULL CREDIT. DO YOUR OWN WORK.

Name: Solution

Two  $\frac{3}{4}$  in steel cables are used to support a 5000 lb crate. Determine the normal stress in each cable.

Hint: Sketch the Free Body Diagram of the concurrent coplanar force system at A and solve for the force in each cable using either the Force Triangle Method or Equilibrium Equations.



Law of Sines

$$\frac{T_{AB}}{\sin 40^\circ} = \frac{T_{AC}}{\sin 60^\circ} = \frac{5000 \text{ lb}}{\sin 80^\circ}$$

$$T_{AB} = \frac{\sin 40^\circ (5000 \text{ lb})}{\sin 80^\circ} = 3264 \text{ lb}$$

$$T_{AC} = \frac{\sin 60^\circ (5000 \text{ lb})}{\sin 80^\circ} = 4397 \text{ lb}$$

$$\sigma_{AB} = \frac{P}{A} = \frac{3264 \text{ lb}}{\frac{\pi (0.75 \text{ in})^2}{4}} = \underline{\underline{7388 \text{ psi}}}$$

$$\sigma_{AC} = \frac{P}{A} = \frac{4397 \text{ lb}}{\frac{\pi (0.75 \text{ in})^2}{4}} = \underline{\underline{9953 \text{ psi}}}$$