9-11

A 600-lb weight W is supported as shown in Fig. p9-11. Determine the normal stresses in cable BC and rod AB if their cross-sectional areas are 0.025 in.^{2} and 0.5 in.^{2}, respectively.

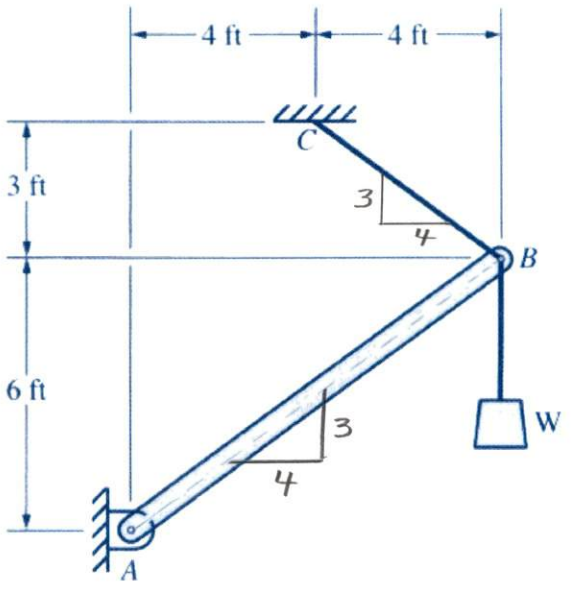
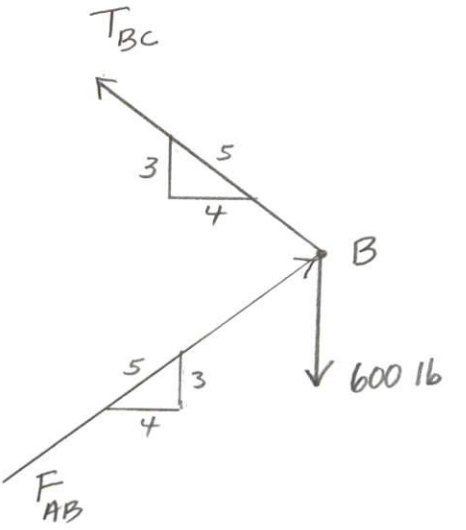
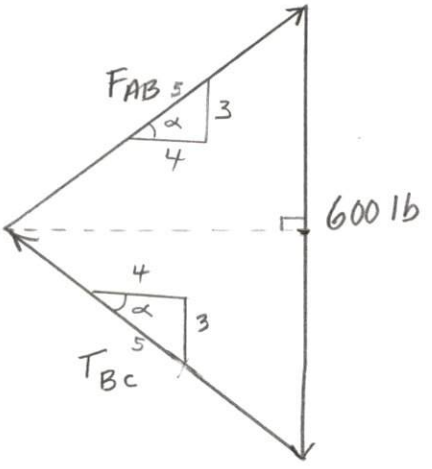


FIGURE P9–11



FBD

Solution.



Force–Triangle

By similar Triangles

$$\frac{F_{AB}}{5} = \frac{300\ lb}{3}$$

$$F_{AB} = \frac{5}{3}(300\ lb) = 500\ lb$$

$$\frac{T_{BC}}{5} = \frac{300\ lb}{3}$$

$$T_{BC} = \frac{5}{3}(300\ lb) = 500\ lb$$

Normal stresses

Cable

$$\sigma_{BC} = \frac{P}{A} = \frac{500\ lb}{0.025\ in^2} = 20\,000\ psi\ (T)$$

ROD

$$\sigma_{AB} = \frac{P}{A} = \frac{500\ lb}{0.5\ in^2} = 1000\ psi\ (C)$$