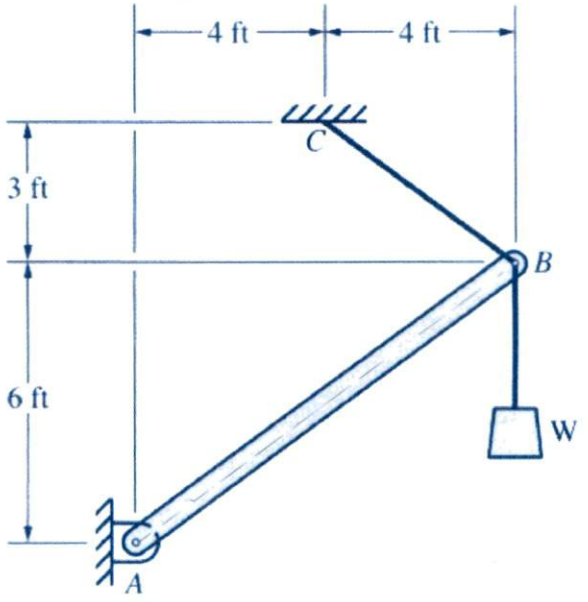
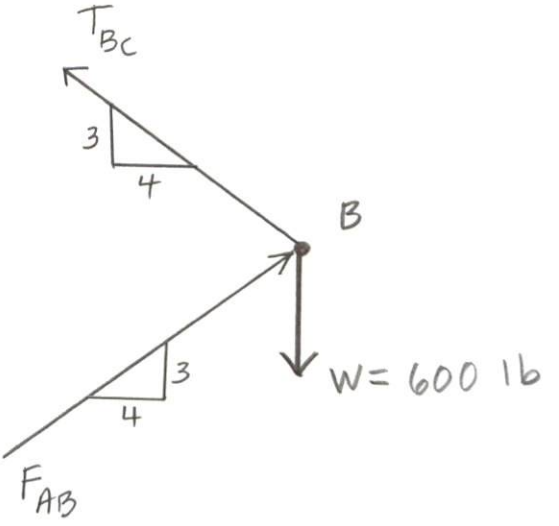
10-7

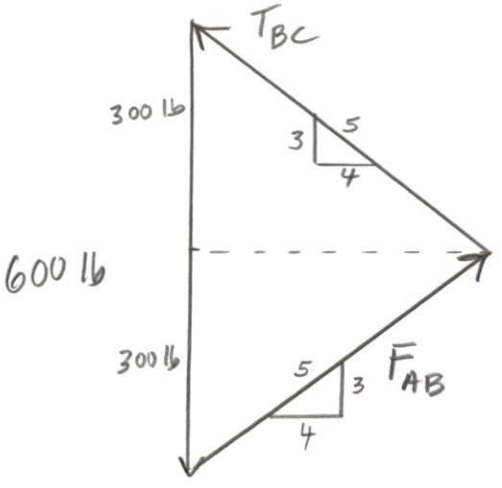
See Fig. Pl0-7. Determine the total elongation of cable BC due to a weight W = 600 lb if the cable has a cross-sectional area 0.025 in.^{2} and is made of steel with E = 30 X 10^6 psi.





FBD

Solution.



Force – Triangle

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

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

$$\delta = \frac{PL}{AE}$$

$$= \frac{500\ lb\ (5\ ft \times 12\ \frac{in}{ft})}{(0.025\ in.^2)(30 \times 10^6\ \frac{lb}{in.^2})}$$

$$= 0.040\ in.\ (elongation)$$