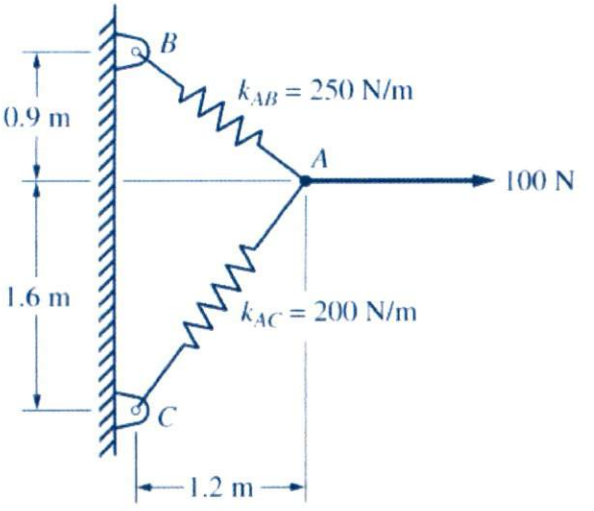
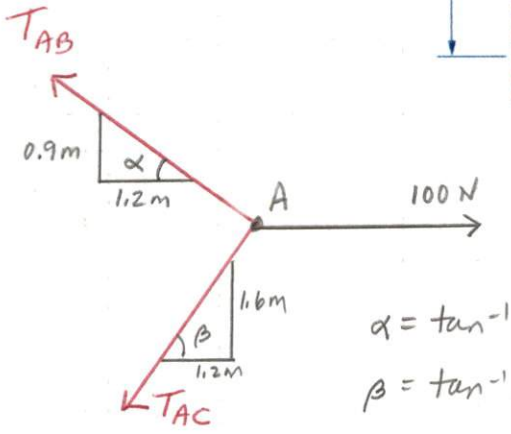
3-29

Determine the amount of stretch in each spring caused by the 100-N force shown in Fig. P3-29.

Solution.

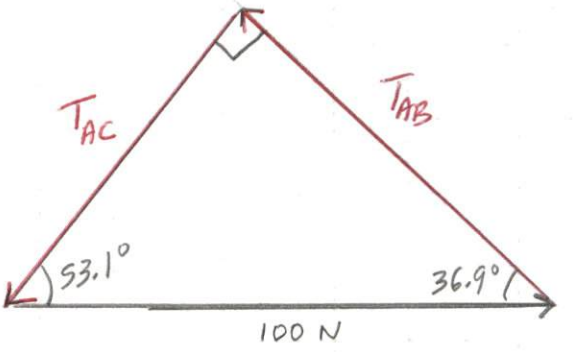




$\alpha = \tan^{-1}\left(\frac{0.9\,m}{1.2\,m}\right) = 36.9°$

$\beta = \tan^{-1}\left(\frac{1.6\,m}{1.2\,m}\right) = 53.1°$

FBD



Force - Triangle

Right-Triangle Math!

$\sin 36.9° = \frac{T_{AC}}{100\,N}$

$T_{AC} = \sin 36.9° (100\,N) = 60\,N$

$\cos 36.9° = \frac{T_{AB}}{100\,N}$

$T_{AB} = \cos 36.9° (100N) = 80\,N$

Elongation of Each Spring $(F = kx)$

$x_{AB} = \frac{T_{AB}}{K_{AB}} = \frac{80\,N}{250\,N/m} = 0.32\,m$

$x_{AC} = \frac{T_{AC}}{K_{AC}} = \frac{60\,N}{200\,N/m} = 0.3\,m$