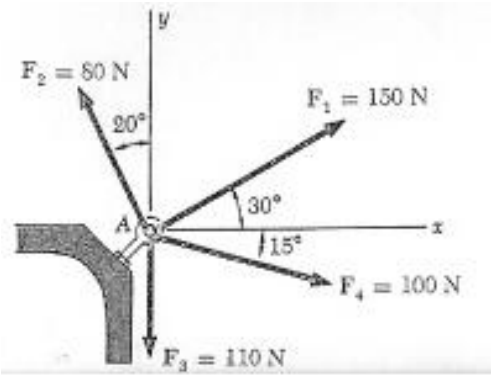
Answer on Question #71547-Physics-Other

F1=150N F2=80N F3=110N F4=100N



Solution

Find the dot product 150N•80N and 110N•100N using magnitudes

$$(150)(80)\cos(90-30+20) = 2084$$

$$(110)(100)\cos(90-15) = 2847$$

Find the dot product 150N•110N and 80N•100N using components

$$150\cos 30\,(-80\sin 20) + 150\sin 30\,(80\cos 20) = 2084$$

$$100\cos 15\,(0) - 100\sin 15\,(-110) = 2847$$

Find the cross product 150N x 80N and 110N x 100N using magnitudes

$$(150)(80)\sin(90-30+20) = 11818$$

$$(110)(100)\sin(90-15) = 10625$$

Find the cross product 150N x 100N and 80N x 110N using components

$$\begin{vmatrix} 150\cos 30 & 150\sin 30 \\ -80\sin 20 & 80\cos 20 \end{vmatrix} = 150\cos 30\,(80\cos 20) - 150\sin 30\,(-80\sin 20) = 11818$$

$$\begin{vmatrix} 0 & -110 \\ 100\cos 15 & -100\sin 15 \end{vmatrix} = -100\sin 15\,(0) - 100\cos 15\,(-110) = 10625$$