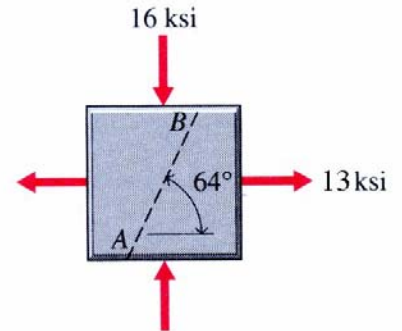


Normal and shear stresses on horizontal and vertical planes through a point in a structural member subjected to plane stress are shown in the figure. Use the stress transformation equations for plane stress to solve for the normal and shear stresses on the inclined plane AB.

Show steps clearly. Include units and box the final answer.



$$\begin{aligned} \sigma_x &= 13 \text{ ksi} \\ \sigma_y &= -16 \text{ ksi} \\ \theta &= -26^\circ \\ \tau_{xy} &= 0 \end{aligned}$$

$$\sigma_{x'} = \frac{13 - 16}{2} + \frac{13 + 16}{2} \cos 2\theta + 0 \sin 2\theta = 7.427 \text{ ksi}$$

$$\sigma_{y'} = \frac{13 - 16}{2} - \frac{13 + 16}{2} \cos 2\theta - 0 \sin 2\theta = -10.427 \text{ ksi}$$

$$\tau_{x'y'} = -\frac{13 + 16}{2} \sin 2\theta + 0 \cos 2\theta = 11.426 \text{ ksi}$$

