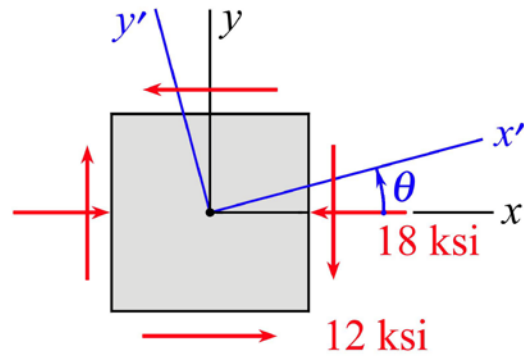
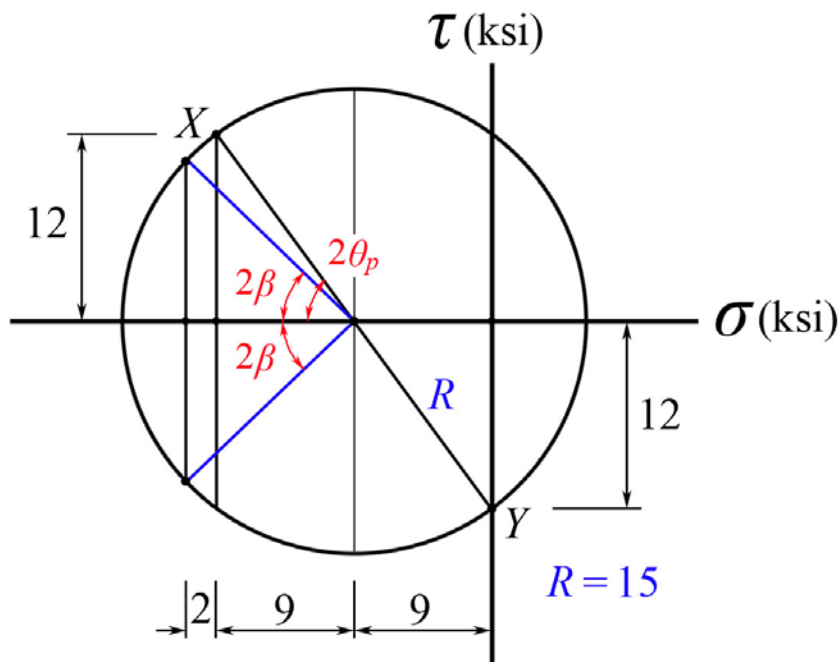


MEEG 3013 Quiz #7.m19.102

For the state of stress shown, draw and use Mohr's circle to determine the range of values of θ for which the magnitude of the normal stress $\sigma_{x'}$ is equal to or less than 20 ksi.



$$X(-18, 12), Y(0, -12) \quad \textcircled{1} \quad R = \sqrt{(12)^2 + (9)^2} = 15$$



$$\cos 2\theta_p = \frac{9}{15} \quad 2\theta_p = 53.13^\circ \quad \textcircled{2} \quad \cos 2\beta = \frac{12}{15} \quad 2\beta = 42.83^\circ \quad \textcircled{2}$$

$$-(360^\circ - 2\theta_p - 2\beta) \leq 2\theta \leq (2\theta_p - 2\beta)$$

$$-132.0^\circ \leq \theta \leq 5.15^\circ \quad \textcircled{2}$$