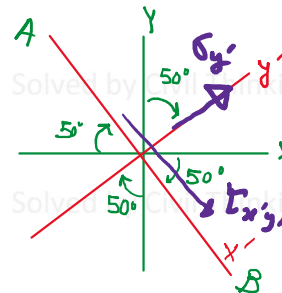
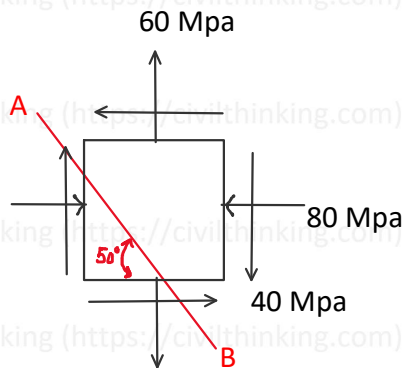


Plane Stress Transformation *question solution using*
STRESS TRANSFORMATION EQUATIONS

Determine the stress components acting on the inclined *plane AB* using **Stress Transformation Equations**



$$\theta = -50^\circ [\because \text{cw}]$$

$$\Rightarrow 90 + \theta = 90 - 50$$

$$= 40^\circ$$

$$\sigma_x = -80 \text{ MPa}$$

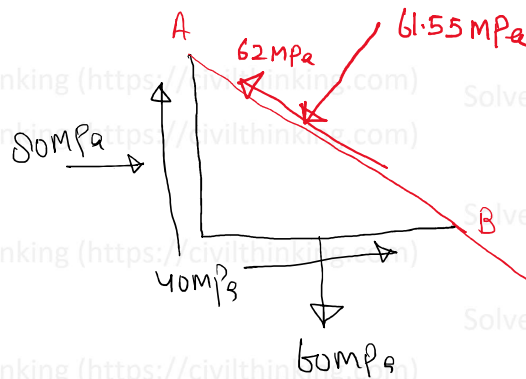
$$\sigma_y = 60 \text{ MPa}$$

$$\tau_{xy} = -40 \text{ MPa}$$

$$\sigma_{y'} = \frac{\sigma_x + \sigma_y}{2} + \frac{\sigma_x - \sigma_y}{2} \cos 2(90 + \theta) + \tau_{xy} \sin 2(90 + \theta)$$

$$\Rightarrow \sigma_{y'} = -61.55 = 61.55 \text{ MPa} [\text{compressive}]$$

$$\tau_{x'y'} = \frac{\sigma_x - \sigma_y}{2} \sin 2\theta + \tau_{xy} \cos 2\theta = -62 = 62 \text{ MPa} (\swarrow)$$



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