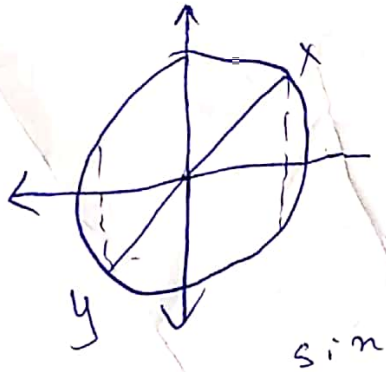
1.]



$x \to (600, -100)$

$y \to (400, 100)$

$C \to (500, 0)$

$r = \sqrt{(100)^2 + (100)^2}$

$= 100\sqrt{2}\ MPa$

$\sin 2\theta = \frac{1}{\sqrt{2}}$

$2\theta = 45 \Rightarrow \theta = \frac{45}{2}$

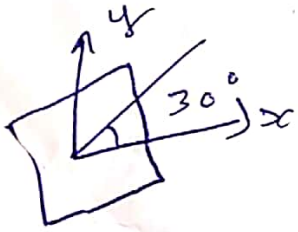
$\tau_{max} = A'B' = 100\sqrt{2}\ MPa$

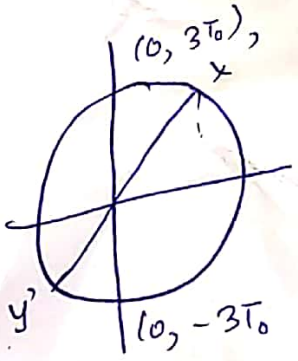
$\tan\theta = 1 \Rightarrow \theta = 45$

$\phi = 90 - \theta = 45$

Max stress is at angle $\left(\frac{45}{2}\right)$.

2.]





$x' \to \left(\frac{3\sqrt{3}T_0}{2}, \right.$

$y' \to \left(\frac{-3\sqrt{3}T_0}{2}, \right.$

$\sigma_{x\,net} = \frac{3\sqrt{3}T_0}{2}$

$\sigma_{y\,net} = \frac{-3\sqrt{3}T_0}{2}$

$\tau_{xy\,net} = \frac{-T_0}{2}$

3.] $\sigma_x = 130\ MN/m^2$

$\sigma_y = -70\ MN/m^2$

$\tau_{xy} = 50\ MN/m^2$

$\varepsilon_x = \frac{1}{E}(130 + 0.70)$

1.

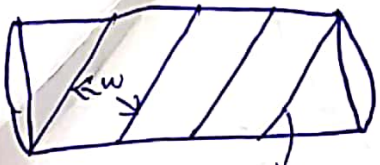
$$\varepsilon_y = \frac{1}{E}\left(-V(130) - 70\right) \quad \left| \quad \tan 2\theta = \frac{\gamma}{\varepsilon_x - \varepsilon_y}\right.$$

$\nu = 0.2$, $E = 205\ GN/m^2$ $\qquad G = 78.8\ GN/m^2$

$$\gamma_{xy} = \frac{\tau_{xy}}{G} = \frac{80 \times 10^6 \times 10^{-3}}{78.8 \times 10^3}$$

$$\varepsilon_{principal} = \frac{\varepsilon_x + \varepsilon_y}{2} \pm \sqrt{\left(\frac{\varepsilon_x - \varepsilon_y}{2}\right)^2 + \gamma_{xy}^2}$$

4.



$$\sigma_2 = \sigma_x = \frac{pr}{2t}$$

$$\sigma_{\theta\theta} = \sigma_y = \frac{pr}{t}$$