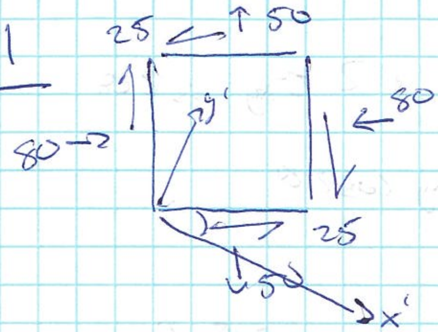
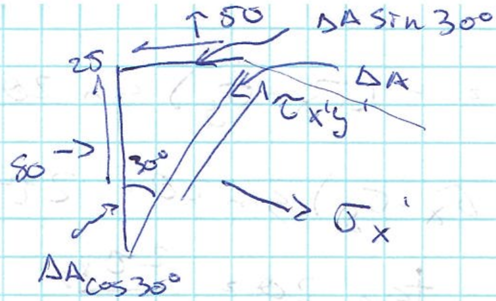
9.1





(1) $\Sigma F_x = 0 = 80\,\Delta A \cos 30° - 25\,\Delta A \sin 30° + \cos 30°\,\sigma_{x'}\,\Delta A + \sin 30°\,\tau_{x'y'}\,\Delta A = 0$

(2) $\Sigma F_y = 0 = 25\,\Delta A \cos 30° \mp 50\,\Delta A \sin 30° \mp \sin 30°\,\sigma_{x'}\,\Delta A + \cos 30°\,\tau_{x'y'}\,\Delta A = 0$

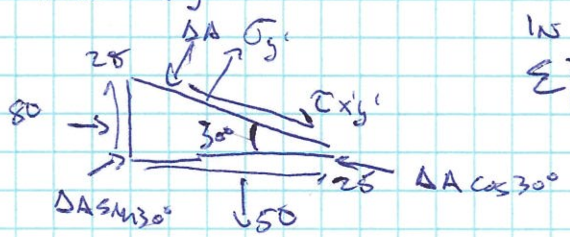
$$
\begin{aligned}
(1) &\Rightarrow (\tau_{x'y'} \sin 30° + \sigma_{x'} \cos 30° = -80 \cos 30° + 25 \sin 30°) / \cos 30° \\
+\ (2) &\Rightarrow (\tau_{x'y'} \cos 30° - \sigma_{x'} \sin 30° = -25 \cos 30° \mp 50 \sin 30°) / \sin 30°
\end{aligned}
$$

$$\tau_{x'y'} (\tan 30° + \cot 30°) = -80 + 25 \tan 30° - 25 \cot 30° - 50$$

$$\tau_{x'y'} = -68.8 \text{ MPa}$$

$$\sigma_{x'} = -25.8 \text{ MPa}$$

For $\sigma_{y'}$



IN THIS CASE, WE SAVE SOME TIME BY CONSIDERING $\Sigma F_{y'}$ ← SUM OF FORCES IN y'

$$\Sigma F_{y'} = 0 \Rightarrow \sigma_{y'}\Delta A + 25\,\Delta A \sin 30° \cos 30° + 80\,\Delta A \sin 30° \sin 30° + 25\,\Delta A \cos 30° \sin 30° - 50\,\Delta A \cos 30° \cos 30°$$

$$\Rightarrow \sigma_{y'} = -25 \sin 30° \cos 30° - 80 \sin^2 30° - 25 \sin 30° \cos 30° + 50 \cos^2 30°$$

$$= \underline{-4.15 \text{ MPa}}$$