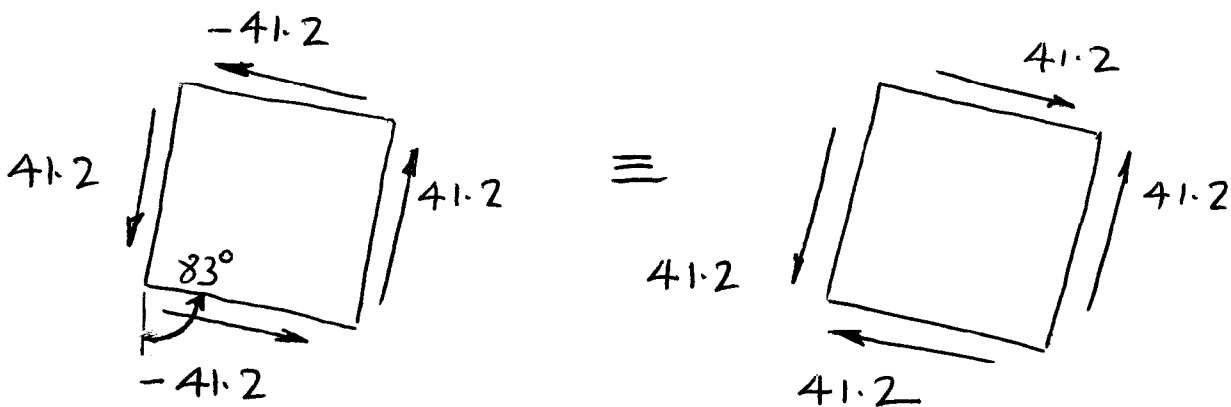


The maximum shear stresses act on planes at 45° to the principal planes.

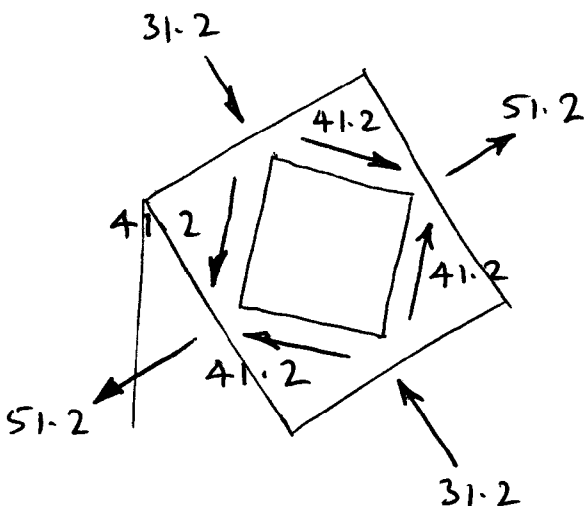
$$\begin{aligned}\tau_{83} &= -\frac{1}{2}(20)\sin 166^\circ + 40\cos 166^\circ \\ &= -2.4 - 38.8 = \underline{-41.2 \text{ MN/m}^2}\end{aligned}$$

$$\begin{aligned}\tau_{173} &= -\frac{1}{2}(20)\sin 346^\circ + 40\cos 346^\circ \\ &= 2.4 + 38.8 = \underline{41.2 \text{ MN/m}^2}\end{aligned}$$



Alternatively

$$\begin{aligned}\tau_{\text{Max}} &= \frac{1}{2}(\sigma_1 - \sigma_2) \\ &= \frac{1}{2}(51.2 - (-31.2)) = \underline{41.2 \text{ MN/m}^2}\end{aligned}$$



Max shear stress point towards the larger principal stress σ_1
Note - normal stresses on max shear planes not shown