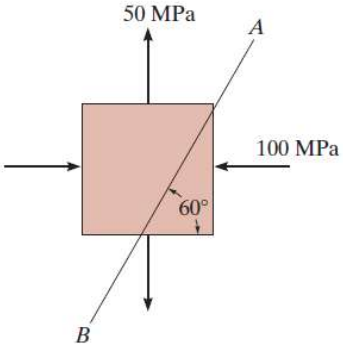
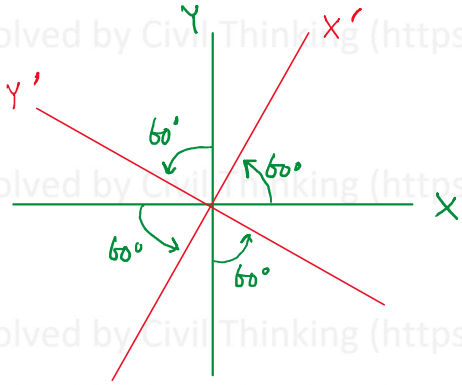
Plane Stress Transformation *question solution using Method of Equilibrium*

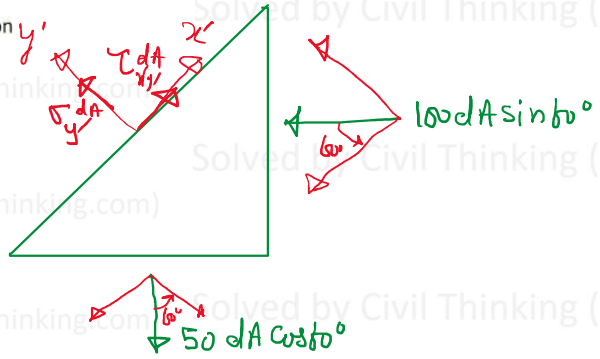
9–13. Determine the stress components acting on the inclined plane AB. Solve the problem using the method of equilibrium described in Sec. 9.1.



Prob. 9–13

Mechanics of Materials, R.C. Hibbeler 1oth Ed. Pearson





$+\nearrow \Sigma F_{y'} = 0$:

$\sigma_{y'} dA + 100\, dA \sin 60^\circ \sin 60^\circ - 50\, dA \cos 60^\circ \cos 60^\circ = 0$

$\Rightarrow \sigma_{y'} = -62.5$ MPa

compressive.

$+\nearrow \Sigma F_{x'} = 0$:

$\tau_{x'y'} dA - 100\, dA \sin 60^\circ \cos 60^\circ - 50\, dA \cos 60^\circ \sin 60^\circ = 0$

$\Rightarrow \tau_{x'y'} = 64.9$ MPa

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