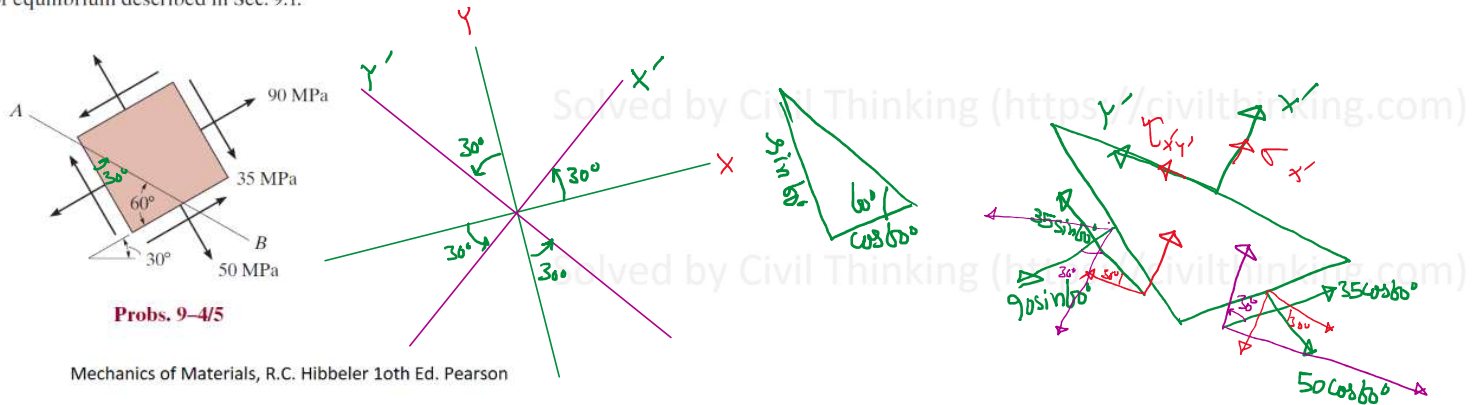


Plane Stress Transformation question solutions

*9-4. The state of stress at a point in a member is shown on the element. Determine the stress components acting on the inclined plane AB . Solve the problem using the method of equilibrium described in Sec. 9.1.



$$+\sum F_{x'} = 0 : \sigma_{x'} + 35 \cos 60^\circ \cos 30^\circ - 50 \cos 60^\circ \sin 30^\circ + 35 \sin 60^\circ \sin 30^\circ - 90 \sin 60^\circ \cos 30^\circ = 0$$

$$\Rightarrow \sigma_{x'} = 49.69 \text{ MPa}$$

$$+\sum F_{y'} = 0 : \tau_{x'y'} - 50 \cos 60^\circ \cos 30^\circ - 35 \cos 60^\circ \sin 30^\circ + 35 \sin 60^\circ \cos 30^\circ + 90 \sin 60^\circ \sin 30^\circ = 0$$

$$\Rightarrow \tau_{x'y'} = -34.82 \text{ MPa} = 34.82 \text{ MPa (}\rightarrow\text{)}$$

This problem was solved by Civil Thinking (<https://civilthinking.com>)

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