1) If a machine part is made of tool L2 steel and a critical point in the material is subjected to in-plane principal stresses $\sigma_1$ and $\sigma_2 = -0.5\sigma_1$, determine the magnitude of $\sigma_1$ in ksi that will cause yielding according to the maximum shear stress theory.

**Now Solve** using the maximum distortion energy theory.

$$\sigma_y = 120 \text{ ksi}$$
2) If the material is machine steel having a yield stress of \( \sigma_Y = 700 \text{ MPa} \), determine the factor of safety with respect to yielding if the maximum shear stress theory is considered.
3) The plate is made of Tobin bronze, which yields at \( \sigma_Y = 25 \text{ ksi} \). Using the maximum distortion energy theory, determine the maximum tensile stress \( \sigma_x \) that can be applied to the plate if a tensile stress \( \sigma_y = 1.5\sigma_x \) is also applied.