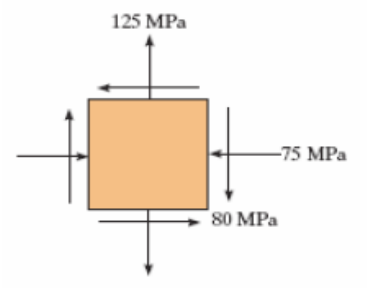
ME 304 Mechanical Engineering Design ()

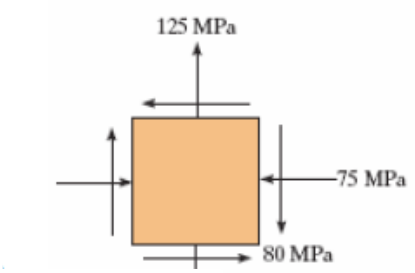
Homework(2)

Q1 The components of plane stress at a critical point on an A-36 structural steel shell are shown. Determine if failure (yielding) has occurred on the basis of the maximum-shear-stress theory.



Q2

The components of plane stress at a critical point on an A-36 structural steel shell are shown. Determine if failure (yielding) has occurred on the basis of the maximum-distortion-energy theory.



Q3 The internal loadings at a critical section along the steel drive shaft of a ship are calculated to be a torque of 3.45 kN·m, a bending moment of 2.25 kN·m, and an axial thrust of 12.5 kN. If the yield points for tension and shear are $\sigma_Y = 700$ MPa and $\tau_Y = 350$ MPa, respectively, determine the required diameter of the shaft using the maximum-shear-stress theory.