

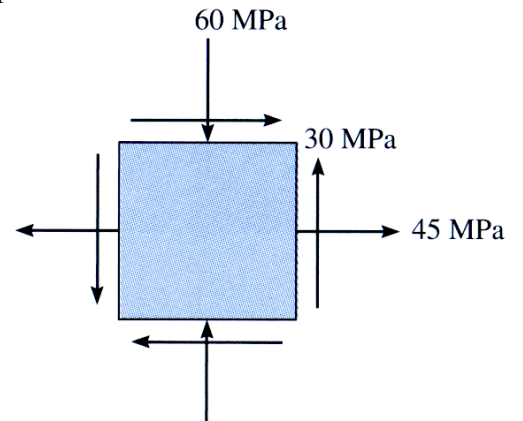
BE 110 - Mechanics of Materials - Winter 2004

Exam 3 –Stress and Strain

Name:

Section: D

1. Determine the (a) principal stresses and (b) maximum in-plane shearing stress and average normal stress for the state of plane stress shown. Show your answers on appropriate sketches.



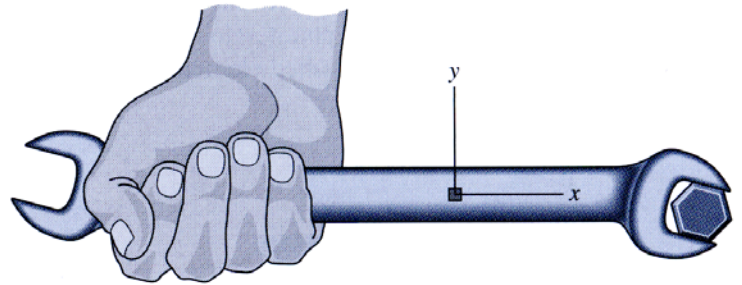
BE 110 - Mechanics of Materials - Winter 2004

Exam 3 –Stress and Strain

Name:

Section: D

2. The state of strain at the point on the wrench has components $\varepsilon_x = 120(10^{-6})$, $\varepsilon_y = -180(10^{-6})$, $\gamma_{xy} = 150(10^{-6})$. Determine the state of strain on an element rotated 30° clockwise from the original. (No sketch required.)



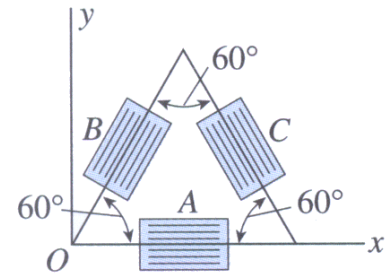
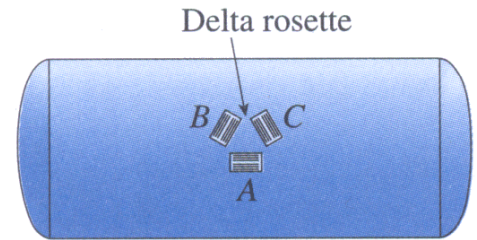
BE 110 - Mechanics of Materials - Winter 2004

Exam 3 –Stress and Strain

Name:

Section: D

3. A rosette is mounted on the outside of a cylindrical compressed air tank. The recorded strains are $\epsilon_A = 80(10^{-6})$ and $\epsilon_B = \epsilon_C = 275(10^{-6})$. If the tank has an r/t ratio of 25, $E = 200$ GPa, and $\nu = 0.2273$, what is the air pressure p in the tank?



BE 110 - Mechanics of Materials - Winter 2004

Exam 3 –Stress and Strain

Name:
Section: D

4. A 1.5-kip horizontal force, a 6-kip vertical force, and a 9-kip-in. couple are applied at the top of the 2.5-in. diameter solid post. Determine the stress state at point K , and show your answers on an appropriate sketch.

