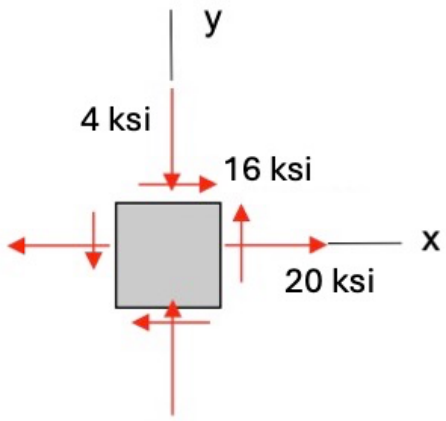
ME 323: Mechanics of Materials ***Homework H25***

Summer 2025 ***Assigned/due: July 22/July 25***

A state of plane stress at point A in a structural member has the following xy-components of stress: $(\sigma_x, \sigma_y, \tau_{xy}) = (20, -4, 16)$ ksi.



a) Determine the values of σ_{ave} and R for this state of stress.

b) Draw in Mohr's circle on the axes provided below where 1 grid marker = 2 ksi.

c) Based on your Mohr's circle, what are the max/min values for normal stress (i.e., the principal components of stress) at point A?

d) Based on your Mohr's circle, what are the max/min values for shear stress at point A?

e) Using the stress transformation equations, determine the normal and shear components of stress on the x-face of the stress element that has been rotated CCW through an angle of $\theta = 40°$. Show these components of stress on your Mohr's circle.