1. A composite beam is constructed of a wood beam 6 in. wide and 10 in. deep reinforced on the lower side by a 0.4 in. by 6 in. steel plate. The modulus of elasticity for the wood is \( E_{\text{wood}} = 1,500,000 \) psi and for the steel, the modulus of elasticity is \( E_{\text{steel}} = 30,000,000 \) psi. Using the transformed area method, compute the location of the centroid relative to the top surface of the wood for the composite cross-section shown. (10 points)
2. Compute the moment of inertia about the z centroidal axis for the beam cross-section shown. (10 points)
3. For the beam and cross-section shown:
   a. Draw complete shear force and bending moment diagrams for the beam. (10 points)
   b. Determine the maximum compression normal stress in the beam, and indicate where this stress occurs along the beam in the interval $0 < x < 10$ m. (10 points)
4. The beam cross section shown is subjected to a transverse shear force of 80 kips acting parallel to the y-axis. Compute the transverse shear stress at point H, which is located 3 inches above the z centroidal axis. Show your detailed calculations. (10 points)
5. For the beam and loading shown, determine the equation of the elastic curve in the interval 0<x<L. Assume $EI$ is constant. (10 points)
6. Aluminum plates (1) \( (E_{\text{alum}} = 10,000 \text{ ksi}) \) have been attached to a timber beam (2) \( (E_{\text{wood}} = 1,000 \text{ ksi}) \) as shown to strengthen the beam. If the maximum bending stress in the timber is 800 psi, what is the maximum bending stress in the aluminum plates? (5 points)