1. The beam shown is fixed to the wall at A and pin-connected to a ½-inch-diameter rod BC. If $E = 29,000$ ksi for both the beam and the rod, determine the force developed in the rod due to the loading. The moment of inertia of the beam about its neutral axis is $I = 475 \text{ in}^4$. (20 points)
2. A 1-in.-diameter solid steel shaft is loaded and supported as shown. Consider stress elements located at point G (on the +z side of the shaft) and point H (on the +y side of the shaft). For each of these points: (30 points)

- Draw a stress element and include appropriate coordinate axes (either x-y or x-z).
- Compute the normal stress and shear stress acting on the surfaces of the stress element.
- Show the results of your stress calculations on the stress element.
- Compute the principal stresses $\sigma_{p1}$ and $\sigma_{p2}$ only.

  Note: You do not have to draw Mohr’s circle. You do not have to show the orientation of the principal stresses. Simply report the values for $\sigma_{p1}$ and $\sigma_{p2}$. 

Extra calculation space for problem 2