HW wk-07 | due 03.12.2019 in Lecture | Lateral Forces + Stresses

1. Find the value of the moment of inertia \((I_{xx})\) and the section modulus \((S_{xx})\) for the above five shapes. You may recall from lecture that \((I_{xx} = bh^3/12)\) and that \((S_{xx} = bh^2/6)\). (Hint: subtract the inside rectangle \(I_{xx}\) or \(S_{xx}\) from the outside rectangle \(I_{xx}\) or \(S_{xx}\))

2. For the following column and rod: 1) draw the axial load diagram 2) calculate the stress in each member’s maximum axial force.  \(\text{Axial stress } f_a \text{ equals force } P \div \text{cross sectional area } A \) \(f_a = P/A\)
3. Find the seismic weight \( W \) for each story level of the following structure given the following, please show all calculations below neatly and clearly:

- Roof DL = 25 psf
- Roof LL = 20 psf
- 2nd DL = 80 psf
- 2nd LL = 50 psf
- Curtain Wall = 15 psf (assume curtain wall at all vertical exterior surfaces)
- 2nd Floor Atrium dimensions 25'-0" x 40'-0". Do not calculate core walls

4. Assume that \( V_{\text{base}} = 0.2W \), Calculate the seismic loading for both story levels use the equiv. lateral force formula

\[
F_p = \frac{(w_p)(h_p)V_{\text{base}}}{\sum (w_i)(h_i)}
\]

Use the table format presented in class.