

DEFLECTION OF A SIMPLY SUPPORTED BEAM WITH CONCENTRATED LOAD:

$$\underline{\underline{L}} := 10 \cdot 12 \cdot \text{in} \quad E := 30 \cdot 10^6 \cdot \text{psi} \quad I_1 := 3.16 \cdot \text{in}^4 \quad I_2 := 6.59 \cdot \text{in}^4$$

$$\sigma_y := 30 \cdot 10^3 \cdot \text{psi} \quad a := \frac{L}{2} \quad c_1 := 1.5 \cdot \text{in} \quad c_2 := 2 \cdot \text{in}$$

**3 x 3 x .25 BEAM:**

$$F_{\max 1} := \frac{\sigma_y \cdot I_1}{a \cdot c_1} \quad \boxed{F_{\max 1} = 1.053 \times 10^3 \text{ lbf}}$$

$$\delta_{y1} := \frac{-F_{\max 1} \cdot L^3}{48 \cdot E \cdot I_1} \cdot \left[ \frac{3 \cdot a}{L} - \left( \frac{4 \cdot a}{L} \right)^3 \right]$$

$$\boxed{\delta_{y1} = 0.155 \text{ in}}$$

**4 x 4 x .188 BEAM:**

$$F_{\max 2} := \frac{\sigma_y \cdot I_2}{a \cdot c_2} \quad \boxed{F_{\max 2} = 1.647 \times 10^3 \text{ lbf}}$$

$$\delta_{y2} := \frac{-F_{\max 2} \cdot L^3}{48 \cdot E \cdot I_2} \cdot \left[ \frac{3 \cdot a}{L} - \left( \frac{4 \cdot a}{L} \right)^3 \right]$$

$$\boxed{\delta_{y2} = 0.116 \text{ in}}$$