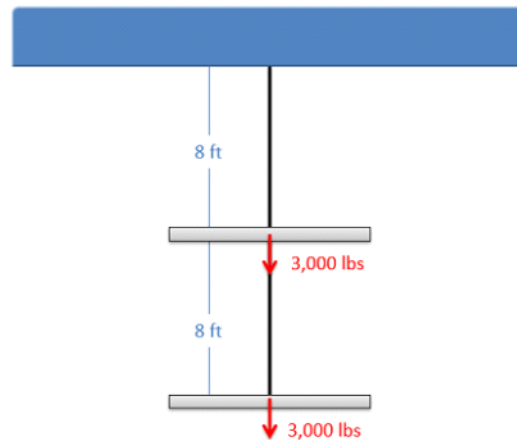# Problem 2

A 1-inch diameter steel cable (E=29,000 ksi) is supporting a multi-tier walkway as shown to the right.

- What is the maximum axial stress in the cable?
- What is the change in length of each segment of the cable?
- What is the overall change in length of the cable?

top section will have higher stresses

a) $$\sigma_{AB} = \frac{F}{A} = \frac{6000 \text{ lbs}}{\pi(.5 \text{ in})^2} = \boxed{7.64 \text{ ksi}}$$

b) $$\delta_{AB} = \frac{PL}{AE} = \frac{(6000 \text{ lbs})(96 \text{ in})}{(\pi(.5 \text{ in})^2)(29 \times 10^6 \frac{\text{lbs}}{\text{in}^2})} = \boxed{.025 \text{ in}}$$

$$\delta_{BC} = \frac{PL}{AE} = \frac{(3000 \text{ lbs})(96 \text{ in})}{(\pi(.5 \text{ in})^2)(29 \times 10^6 \frac{\text{lbs}}{\text{in}^2})} = \boxed{.013 \text{ in}}$$

c) $$\delta_{AC} = \delta_{AB} + \delta_{BC} = \boxed{.038 \text{ in}}$$