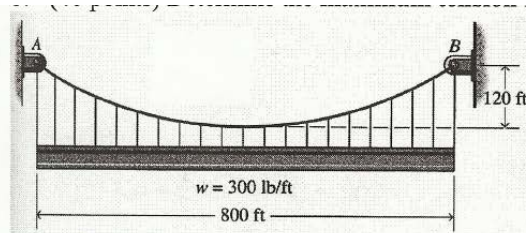
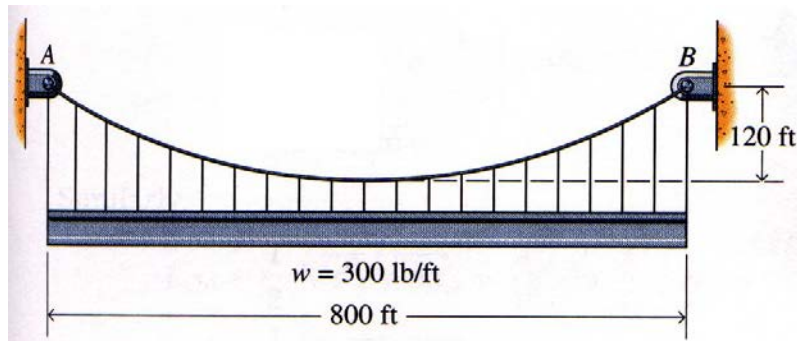


Problem 10: Determine the maximum tension in the cable and the length of the cable.



$$T_{max} = \frac{wL}{2} \sqrt{1 + \left(\frac{L}{4h}\right)^2}$$

$$= \frac{300(800)}{2} \sqrt{1 + \left(\frac{800}{4(120)}\right)^2} = 233,338 \text{ lbs}$$

$$L_{tot} = \frac{L}{2} \left[\sqrt{1 + \left(\frac{4h}{L}\right)^2} + \frac{L}{4h} \sinh^{-1} \left(\frac{4h}{L} \right) \right] = \frac{800}{2} \left[\sqrt{1 + \left(\frac{4(120)}{800}\right)^2} + \frac{800}{4(120)} \sinh^{-1} \left(\frac{4(120)}{800} \right) \right]$$

$$= 846$$

ANSWER: $T_{max} = 233 \text{ kips}$

Length = 846 ft