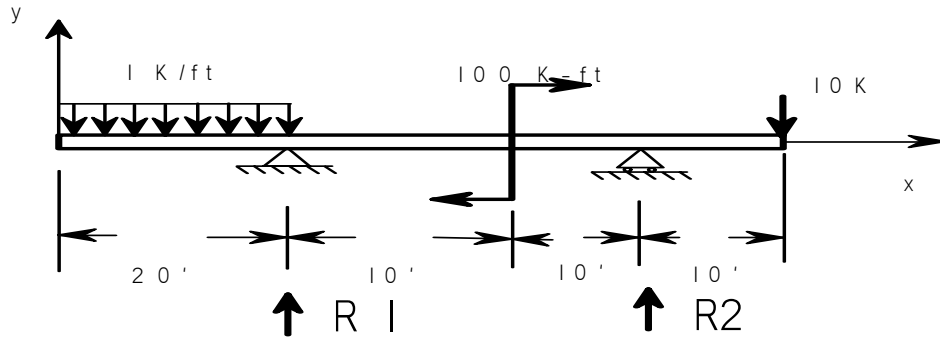


Shames (13.10 Text) Problem 10.34. repeated here for info: Find the supporting forces for the simply supported beam in figure. Then sketch the shear-force and bending moment diagrams, labeling key points. 1K = 1000 lbs



initial estimates: $R_1 := 10$ $R_2 := 5$

equilibrium ...

Given

forces $-1 \cdot 20 + R_1 + R_2 - 10 = 0$

moments wrt RA $1 \cdot 20 \cdot \frac{20}{2} - 100 + R_2 \cdot 20 - 10 \cdot 30 = 0$

$$\text{Find}(R_1, R_2) = \begin{pmatrix} 20 \\ 10 \end{pmatrix} \quad R_1 := 20 \quad R_2 := 10$$

starting from the notes combining various elements and adding an expression for a concentrated moment:

distributed

$$\text{shear}(x) = \sum_{i=1}^{ul} \left[w_i \cdot (x - \xi_{i,0}) \cdot (\xi_{i,0} < x \leq \xi_{i,1}) + w_i \cdot (\xi_{i,1} - \xi_{i,0}) \cdot (x > \xi_{i,1}) \right]$$

$$\text{bending_moment}(x) = \sum_{i=1}^{ul} \left[w_i \cdot \left[\frac{1}{2} \cdot (x - \xi_{i,0})^2 \right] \cdot (\xi_{i,0} < x \leq \xi_{i,1}) \dots \right. \\ \left. + w_i \cdot \left[(\xi_{i,1} - \xi_{i,0}) \cdot (x - \xi_{i,1}) + \frac{1}{2} \cdot (\xi_{i,1} - \xi_{i,0}) \cdot (\xi_{i,1} - \xi_{i,0}) \right] \cdot (x > \xi_{i,1}) \right]$$

