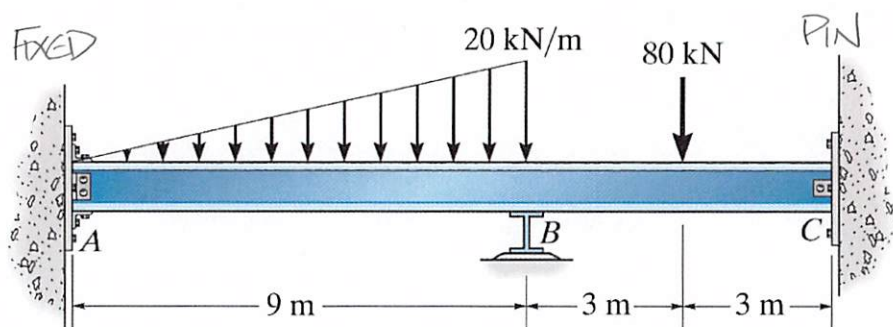


Problem 10-12– Determine the moments at A and B. Assume EI is constant, A is fixed, B is a roller, and C is a pin.

1/2



$$FEM_{AB} = -\frac{WL^2}{30} = -\frac{(20\text{ kN/m})(9\text{ m})^2}{30} = -54\text{ kNm}$$

$$FEM_{BA} = \frac{WL^2}{20} = \frac{(20\text{ kN/m})(9\text{ m})^2}{20} = 81\text{ kNm}$$

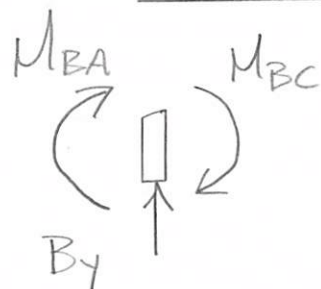
$$FEM_{BC} = -\frac{3PL}{16} = -\frac{3(80\text{ kN})(6\text{ m})}{16} = -90\text{ kNm}$$

$$M_{AB} = \frac{2EI}{9\text{ m}} [\theta_B] - 54\text{ kNm} \quad (1)$$

$$M_{BA} = \frac{2EI}{9\text{ m}} [2\theta_B] + 81\text{ kNm} \quad (2)$$

$$M_{BC} = \frac{3EI}{6\text{ m}} [\theta_B] - 90\text{ kNm} \quad (3)$$

JOINT B



$$\begin{aligned} \sum M_B &= 0 \\ &= -M_{BA} - M_{BC} \end{aligned}$$

$$M_{BA} + M_{BC} = 0 \quad (4)$$

$$(4a) \quad M_{BA} + M_{BC} = 0 = \frac{2EI}{9\text{ m}} [2\theta_B] + 81\text{ kNm} + \frac{3EI}{6\text{ m}} [\theta_B] - 90\text{ kNm}$$

$$\Rightarrow \frac{17}{18} \theta_B - \frac{9\text{ kNm}^2}{EI} = 0$$

$$\underline{\underline{\theta_B = \frac{9.53\text{ kNm}^2}{EI}}}$$

Problem 10-12– Determine the moments at A and B. Assume EI is constant, A is fixed, B is a roller, and C is a pin.

$$\underline{\underline{\theta_B = \frac{9.5294 \text{ kNm}^2}{EI}}}$$

$$M_{AB} = \frac{2EI}{9 \text{ m}} [\theta_B] - 54 \text{ kNm} = \underline{\underline{-51.88 \text{ kNm}}}$$

$$M_{BA} = \frac{2EI}{9 \text{ m}} [2\theta_B] + 81 \text{ kNm} = \underline{\underline{85.24 \text{ kNm}}}$$

$$M_{BC} = \frac{3EI}{6 \text{ m}} [\theta_B] - 90 \text{ kNm} = \underline{\underline{-85.24 \text{ kNm}}}$$