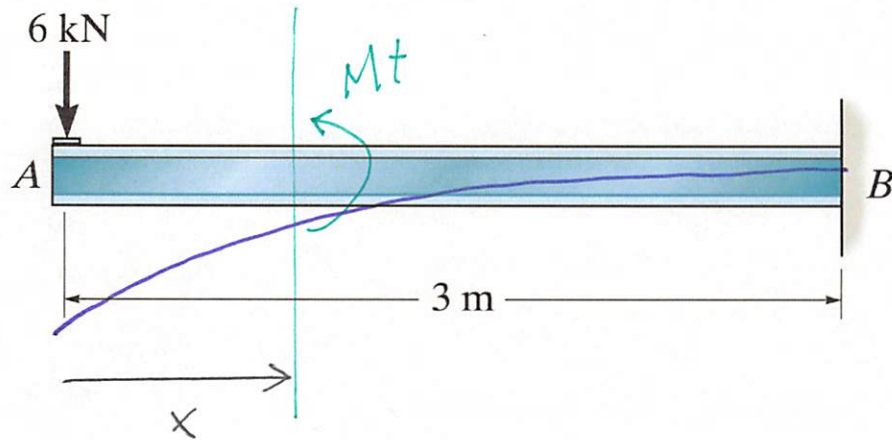


Example 7a-5: Determine the equations for slope and displacement in the following beam.



$$\sum M_{\text{cut}} = 0 = M + 6x \quad M = [-6x] \text{ kNm}$$

$$M(x=0) = 0 \quad \checkmark$$

$$EI\theta = \int M dx = -3x^2 + C_1 \quad EI\theta(x=3\text{m}) = 0 = [-27 \text{ kNm}^2] + C_1$$

$$C_1 = 27 \text{ kNm}^2$$

$$\theta = \frac{\text{kNm}^2}{\frac{\text{kN}}{\text{m}^2} \text{m}^4} = \text{NO UNITS}$$

$$\begin{aligned} y &= \int \theta dx = \frac{1}{EI} \int [-3x^2 + 27] \text{ kNm}^2 dx \\ &= \frac{1}{EI} \left[-x^3 + 27x \right] \text{ kNm}^3 + C_2 \\ &\quad -27 + 81 \end{aligned}$$

$$y(x=3\text{m}) = 0 = \frac{54 \text{ kNm}^3}{EI} + C_2$$

$$C_2 = -\frac{54 \text{ kNm}^3}{EI}$$

$$y = \left[\frac{\text{kNm}^3}{\frac{\text{kN}}{\text{m}^2} \text{m}^4} \right] = \text{m}$$