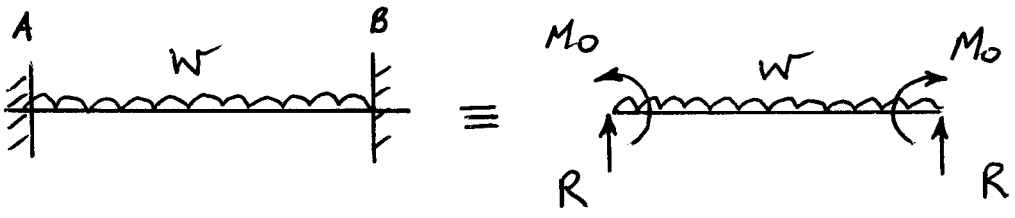
3/



Bending moment at each end due to fixity (same each end because of symmetry) $= M_0$

Vertical reaction at each end $= R$

By statics :

$$R = \frac{WL}{2}$$

Bending moment at x from A :

$$M_x = -M_0 + Rx - \frac{wx^2}{2}$$

From moment – curvature

$$EI\frac{d^2y}{dx^2} = -M_0 + Rx - \frac{wx^2}{2}$$

Integrating for slope :

$$EI\frac{dy}{dx} = -M_0 \cdot x + R\frac{x^2}{2} - \frac{wx^3}{6} + A$$

End condition (i)

$$\frac{dy}{dx} = 0 \quad \text{at } x = 0 \qquad \therefore A = 0$$

End condition (ii)

$$\frac{dy}{dx} = 0 \quad \text{at } x = L$$