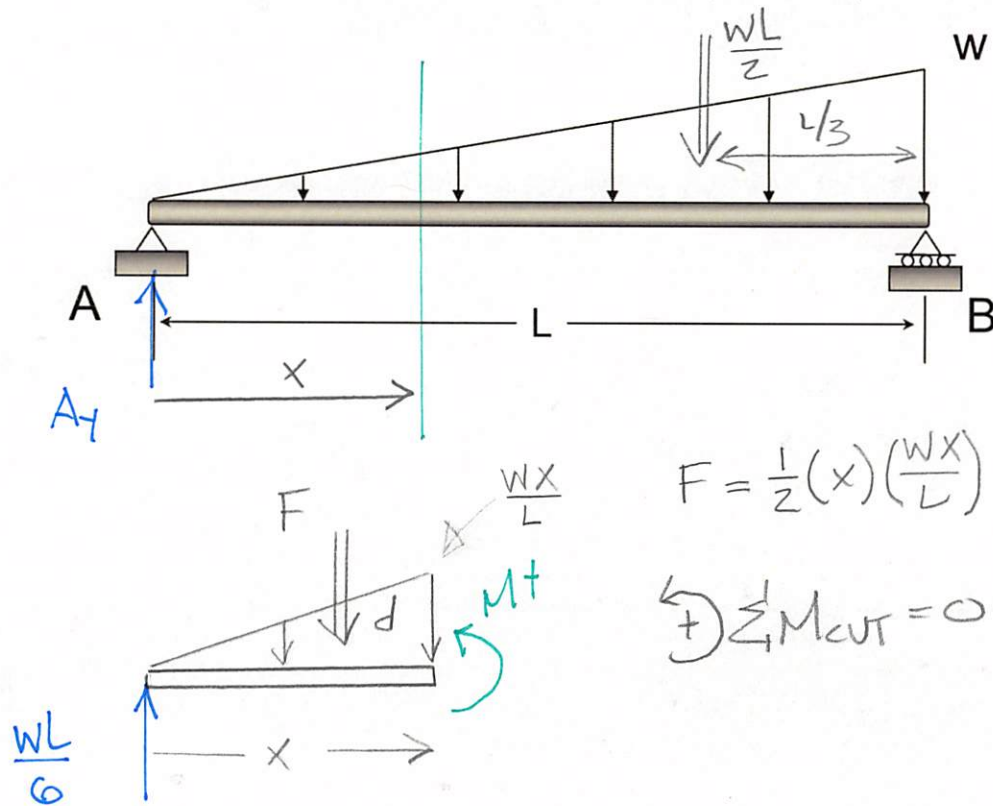


Example 7a-2: Determine the equations for slope and displacement in the following beam.



$$\sum M_B = 0 = \frac{WL}{2} \left(\frac{L}{3} \right) - A_y(L) \quad A_y = \frac{WL}{6}$$

$$w(x) = Ax + B = \frac{W}{L}x$$

$$F = \frac{1}{2}(x) \left(\frac{Wx}{L} \right) = \frac{Wx^2}{2L} \quad d = \frac{1}{3}x$$

$$\sum M_{cut} = 0 = M + \frac{Wx^2}{2L} \left(\frac{x}{3} \right) - \frac{WL}{6}x$$

$$M(x) = \frac{W}{6} \left[-\frac{x^3}{L} + Lx \right]$$

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

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

$$EI\theta = \int M dx = \frac{W}{6} \left[-\frac{x^4}{4L} + \frac{Lx^2}{2} \right] + C_1$$

$$y = \int \theta dx = \frac{W}{6EI} \left[-\frac{x^5}{20L} + \frac{Lx^3}{6} \right] + C_1x + C_2$$

-3/60 + 10/60

$$y(x=0) = 0 = C_2$$

$$y(x=L) = 0 = \frac{7WL^4}{360EI} + C_1L$$

$$C_1 = -\frac{7WL^3}{360EI}$$