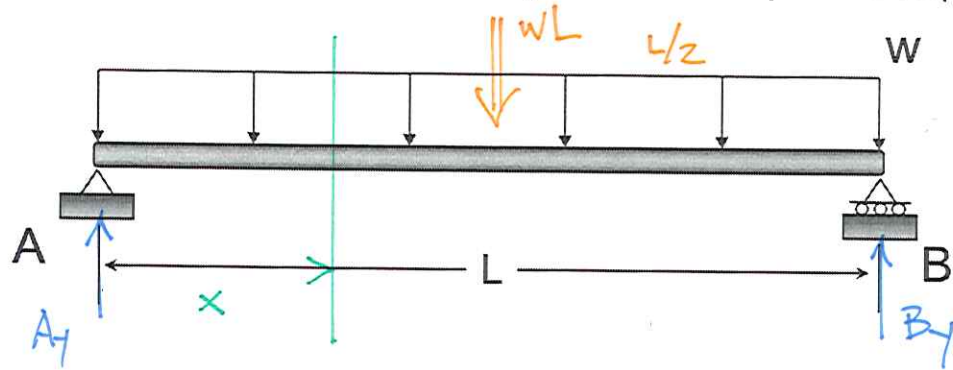
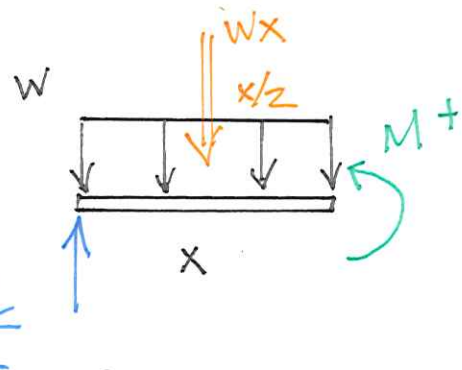


Example 7a-1: Determine the equations for slope and displacement in the following beam.



$$\sum M_B = 0 = wL\left(\frac{L}{2}\right) - A_y(L)$$

$$A_y = \frac{wL}{2}$$



$$\sum M_{cut} = 0 = M + w x\left(\frac{x}{2}\right) - \frac{wL}{2}(x)$$

$$M(x) = \frac{w}{2}(-x^2 + Lx)$$

$$M(x=0) = 0$$

$$M(x=L) = 0$$

$$\theta = \int \frac{M}{EI} dx = \frac{w}{2EI} \int (-x^2 + Lx) dx = \frac{w}{2EI} \left[-\frac{x^3}{3} + \frac{Lx^2}{2} \right] + C_1$$

$$y = \int \theta dx = \frac{w}{2EI} \left[-\frac{x^4}{12} + \frac{Lx^3}{6} \right] + C_1 x + C_2$$

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

$$y(x=L) = 0 = \frac{w}{2EI} \left[\frac{L^4}{12} \right] + C_1 L$$

$$C_1 = -\frac{wL^3}{24EI}$$