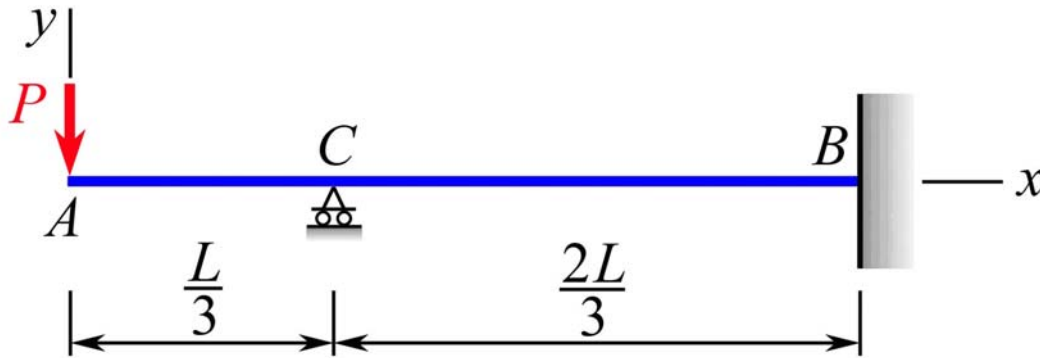


MEEG 3013 Quiz #9.m24.072

The beam shown has a constant EI . Using *moment-area theorems*, determine (a) the reaction C_y at C , (b) the slope θ_A at A .



Drawing of elastic-weight (M/EI) diagram by parts: ②

Sketch of elastic curve: ②

① Boundary condition, $t_{C/B} = (M_C)_{CB} = 0$: ①

$$\frac{4L}{9} \left[\frac{1}{2} \left(\frac{2L}{3} \right) \left(\frac{2C_y L}{3EI} \right) \right] - \frac{L}{3} \left[\frac{2L}{3} \left(\frac{PL}{3EI} \right) \right] - \frac{4L}{9} \left[\frac{1}{2} \left(\frac{2L}{3} \right) \left(\frac{2PL}{3EI} \right) \right] = 0$$

$$C_y = \frac{7P}{4} \quad \mathbf{C_y = \frac{7P}{4} \uparrow} \quad ②$$

② Boundary condition, $\theta_{B/A} = A_{AB} = \theta_B - \theta_A = 0 - \theta_A = -\theta_A$: ①

$$\theta_A = -A_{AB} = - \left[\frac{1}{2} \left(\frac{2L}{3} \right) \left(\frac{2C_y L}{3EI} \right) - \frac{1}{2} (L) \left(\frac{PL}{EI} \right) \right] = \frac{PL^2}{9EI}$$

$$\mathbf{\theta_A = \frac{PL^2}{9EI}} \quad ②$$