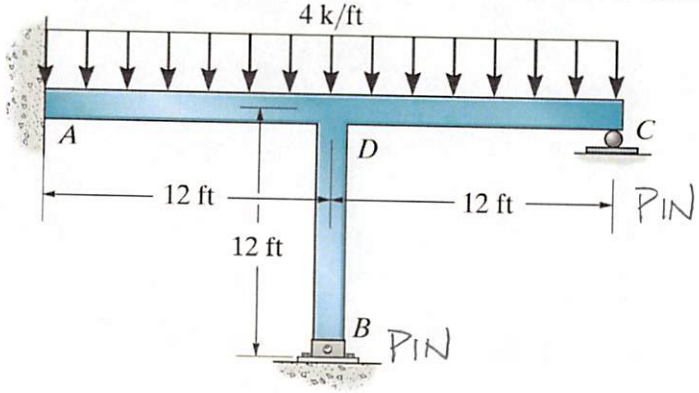
Problem 10b-5 – Determine the moments at the fixed support *A* and joint *D*. Assume *B* is pinned and *EI* is constant.



$$FEM_{AD} = FEM_{DA} = \frac{WL^2}{12} = \frac{4k/ft(12ft)^2}{12} = \pm 48kft$$

$$FEM_{DC} = \frac{WL^2}{8} = \frac{4k/ft(12ft)^2}{8} = -72kft$$

SECTION AD – 2 EQNS

$$M_{AD} = \frac{2EI}{12ft}\left[2\phi_A + \theta_D - 3\psi\right] - 48kft \quad (1)$$

$$M_{DA} = \frac{2EI}{12ft}\left[2\theta_D + \phi_A - 3\psi\right] + 48kft \quad (2)$$

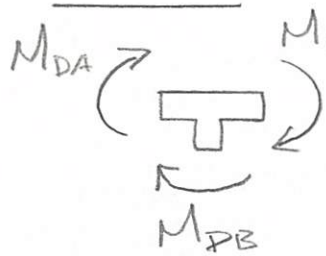
SECTION DC – 1 EQN

$$M_{DC} = \frac{3EI}{12ft}\left[\theta_D - \psi\right] - 72kft \quad (3)$$

SECTION DB – 1 EQN

$$M_{DB} = \frac{3EI}{12ft}\left[\theta_D - \psi\right] \quad (4)$$

JOINT D



$$\circlearrowleft + \sum M_D = 0$$

$$= -M_{DA} - M_{DC} - M_{DB}$$

$$M_{DA} + M_{DC} + M_{DB} = 0 \quad (5)$$

Problem 10b-5 – Determine the moments at the fixed support *A* and joint *D*. Assume *B* is pinned and *EI* is constant.

$$M_{DA} + M_{DB} + M_{DC} = 0$$

$$\left[\frac{2EI}{12ft}(2\theta_D) + 48kft\right] + \left[\frac{3EI}{12ft}(\theta_D)\right] + \left[\frac{3EI}{12ft}(\theta_D) - 72kft\right] = 0$$

$$5/6\,\theta_D = 24kft/EI \qquad \theta_D = \frac{28.8kft^2}{EI}$$

$$M_{AD} = \frac{2EI}{12ft}(\theta_D) - 48kft = \underline{-43.2kft}$$

$$M_{DA} = \frac{2EI}{12ft}(2\theta_D) + 48kft = \underline{57.6kft}$$

$$M_{DC} = \frac{3EI}{12ft}(\theta_D) - 72kft = \underline{-64.8kft}$$

$$M_{DB} = \frac{3EI}{12ft}(\theta_D) = 7.2kft$$

$\Rightarrow M_{DA} + M_{DC} + M_{DB} = 0$ ✓