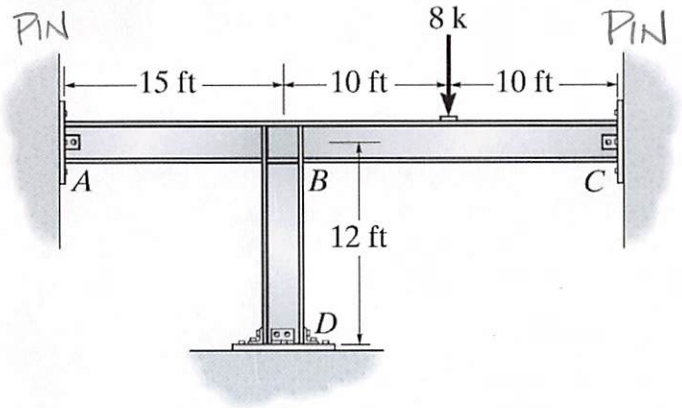
**Problem 10-17** – Determine the moments at *B* and *D*, then draw the moment diagram. Assume *A* and *C* are pinned and *B* and *D* are fixed connected. *EI* is constant.




$$FEM_{CB} = -\frac{3PL}{16} = -\frac{3(8k)(20')}{16} = -30\,k\text{-ft}$$

$$M_{BA} = \frac{3EI}{15'}[\theta_B] \quad (1)$$

$$M_{BC} = \frac{3EI}{20'}[\theta_B] - 30\,k\text{-ft} \quad (2)$$

$$M_{BD} = \frac{2EI}{12'}[2\theta_B] \quad (3)$$

$$M_{DB} = \frac{2EI}{12'}[\theta_B] \quad (4)$$

JOINT B


$$\circlearrowright \sum M_B = 0$$

$$= -M_{BA} - M_{BC} - M_{BD}$$

$$M_{BA} + M_{BC} + M_{BD} = 0 \quad (5)$$

**Problem 10-17** – Determine the moments at *B* and *D*, then draw the moment diagram. Assume *A* and *C* are pinned and *B* and *D* are fixed connected. *EI* is constant.

(5) $M_{BA}+M_{BC}+M_{BD}=0=\underbrace{\frac{3EI}{15}[\theta_B]}_{M_{BA}}+\underbrace{\frac{3EI}{20'}[\theta_B]-30kft}_{M_{BC}}+\underbrace{\frac{2EI}{12}[2\theta_B]}_{M_{BD}}$

$$\Rightarrow \frac{41}{60}\theta_B=\frac{30kft^2}{EI} \qquad \theta_B=\frac{1{,}800kft^2}{41EI}$$

$$M_{BA}=\frac{3EI}{15'}[\theta_B]=8.78kft$$

$$M_{BC}=\frac{3EI}{20'}[\theta_B]-30kft=-23.41\,kft$$

$$M_{BD}=\frac{2EI}{12'}[2\theta_B]=14.63\,kft$$

$M_{BA}+M_{BC}+M_{BD}=0$ ✓

$$M_{DB}=\frac{2EI}{12'}[\theta_B]=7.32kft$$