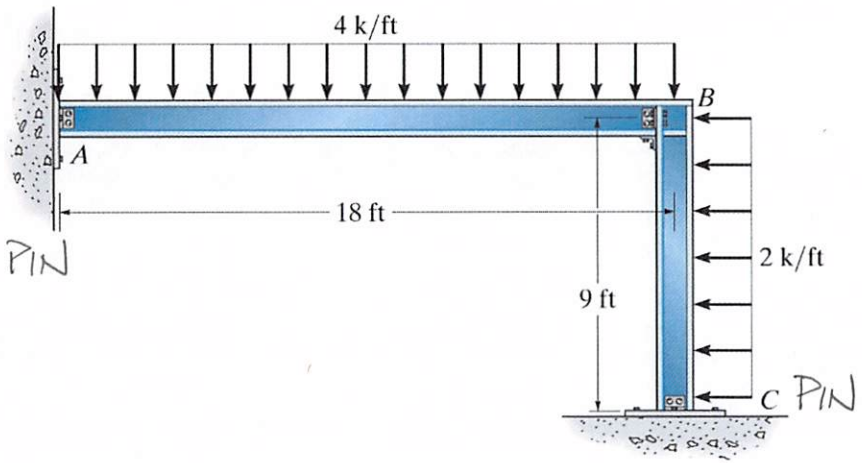
Problem 10b-2 – Determine the reactions at the supports. Assume *A* and *C* are pins, *B* is fixed, and *EI* is constant.



$$FEM_{BA} = \frac{WL^2}{8} = \frac{(4k/ft)(18')^2}{8} = 162\,kft$$

$$FEM_{BC} = \frac{WL^2}{8} = \frac{(2k/ft)(9')^2}{8} = 20.25\,kft$$

JOINT B

$$M_{BA} = \frac{3EI}{18'}[\theta_B] + 162\,kft \quad (1)$$

$$M_{BC} = \frac{3EI}{9'}[\theta_B] - 20.25\,kft \quad (2)$$

$$\circlearrowleft + \sum M_B = 0 = -M_{BA} - M_{BC}$$

$$M_{BA} + M_{BC} = 0 \quad (3)$$

$$(3)\ M_{BA} + M_{BC} = 0 = \underbrace{\frac{3EI}{18'}[\theta_B] + 162\,kft}_{M_{BA}} + \underbrace{\frac{3EI}{9'}[\theta_B] - 20.25\,kft}_{M_{BC}}$$

$$\tfrac{1}{2}\theta_B = -\frac{141.75\,kft^2}{EI}$$

$$\theta_B = -\frac{283.5\,kft^2}{EI}$$

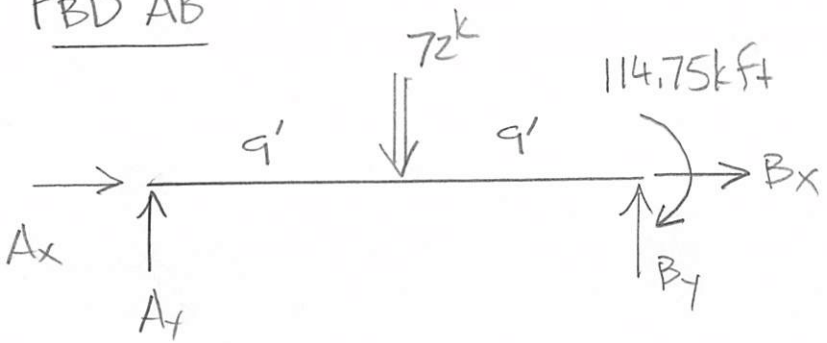
Problem 10b-2 – Determine the reactions at the supports. Assume *A* and *C* are pins, *B* is fixed, and *EI* is constant.

$$M_{BA} = \frac{3EI}{18'}[\theta_B] + 162\,k\text{-}ft = \underline{114.75\,k\text{-}ft}$$

$$M_{BC} = \frac{3EI}{9'}[\theta_B] - 20.25\,k\text{-}ft = \underline{-114.75\,k\text{-}ft}$$

$M_{BA} + M_{BC} = 0$ ✓

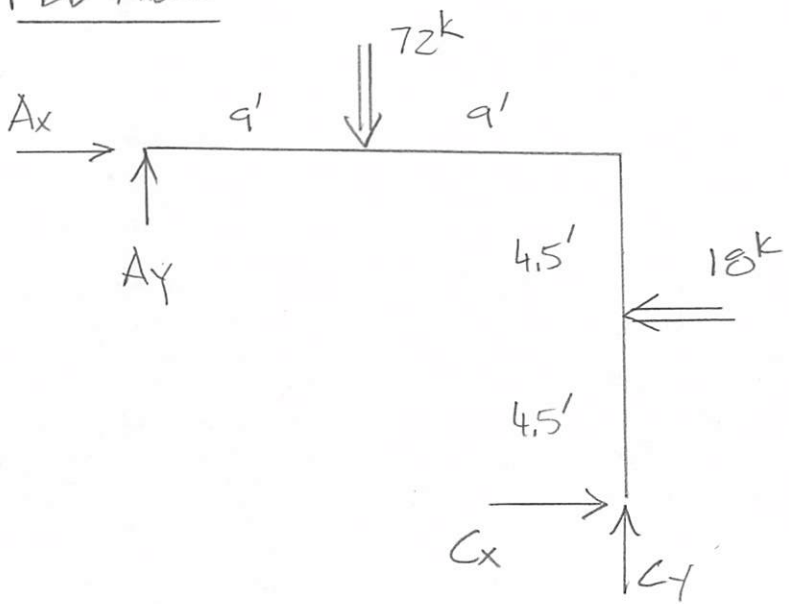
FBD AB



$$\circlearrowleft^{+} \sum M_B = 0 = -114.75\,k\text{-}ft + 72^k(9') - A_y(18')$$

$$\underline{A_y = 29.625^k}$$

FBD ABC



$$\circlearrowleft^{+} \sum M_C = 0 = 18^k(4.5') + 72^k(9') - A_y(18') - A_x(9')$$

$$\underline{A_x = 21.75^k}$$

$$+\uparrow \sum F_y = 0 = A_y + C_y - 72^k \qquad \underline{C_y = 42.375^k}$$

$$\pm\rightarrow \sum F_x = 0 = A_x + C_x - 18^k \qquad \underline{C_x = -3.75^k}$$