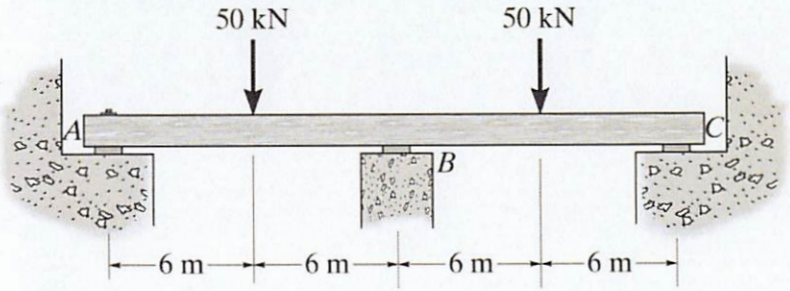
Problem 9-11 - Determine the reactions at the supports. Assume *A* is a pin and *B* and *C* are rollers. *EI* is constant.

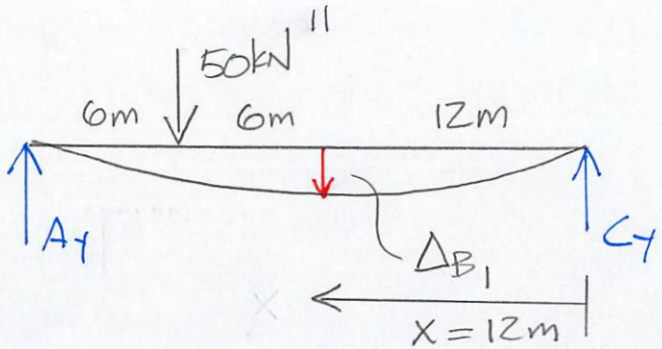


$$\Delta_{B_1} + \Delta_{B_2} + \Delta_{BB} = 0$$

$$\Delta_{B_1} = \frac{Pbx}{6LEI}\left[L^2 - b^2 - x^2\right]$$

$$= \frac{-50\text{kN}(6\text{m})(12\text{m})}{6(24\text{m})EI}\left[(24\text{m})^2 - (6\text{m})^2 - (12\text{m})^2\right]$$

$$= -\frac{9{,}900\text{kN m}^3}{EI}$$



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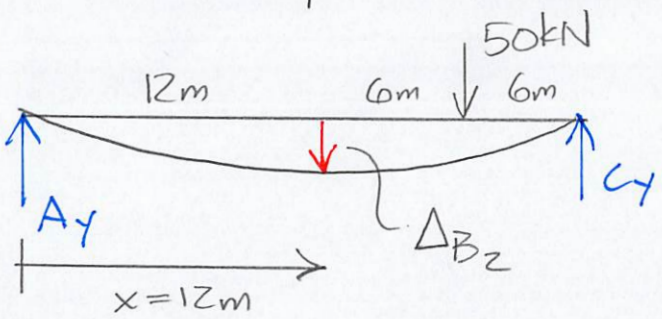
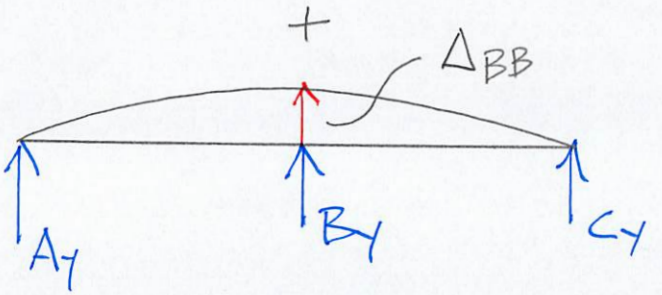


$$\Delta_{B_2} = \Delta_{B_1}$$

+



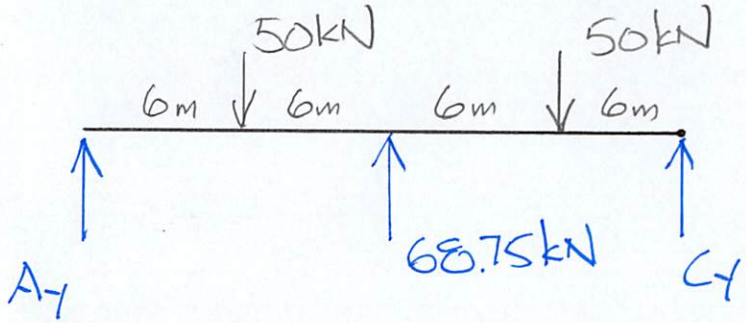
$$\Delta_{BB} = \frac{PL^3}{48EI} = \frac{B_y(24\text{m})^3}{48EI} = B_y\frac{288\text{m}^3}{EI}$$

$$\Delta_{B_1} + \Delta_{B_2} + \Delta_{BB} = 0 = 2(\Delta_{B_1}) + \Delta_{BB}$$

$$\Rightarrow 2\left[\frac{9{,}900\text{kN m}^3}{EI}\right] = B_y\left[\frac{288\text{m}^3}{EI}\right]$$

$$B_y = 68.75\text{kN}$$

Problem 9-11 - Determine the reactions at the supports. Assume *A* is a pin and *B* and *C* are rollers. *EI* is constant.



$$\circlearrowleft + \sum M_C = 0 = 50\text{kN}(6\text{m} + 18\text{m}) - 68.75\text{kN}(12\text{m}) - A_y(24\text{m})$$

$$A_y = 15.625\text{ kN}$$

$$+\uparrow \sum F_y = 0 = A_y + C_y + 68.75^{k} - 2(50\text{kN})$$

$$C_y = 15.625\text{kN}$$