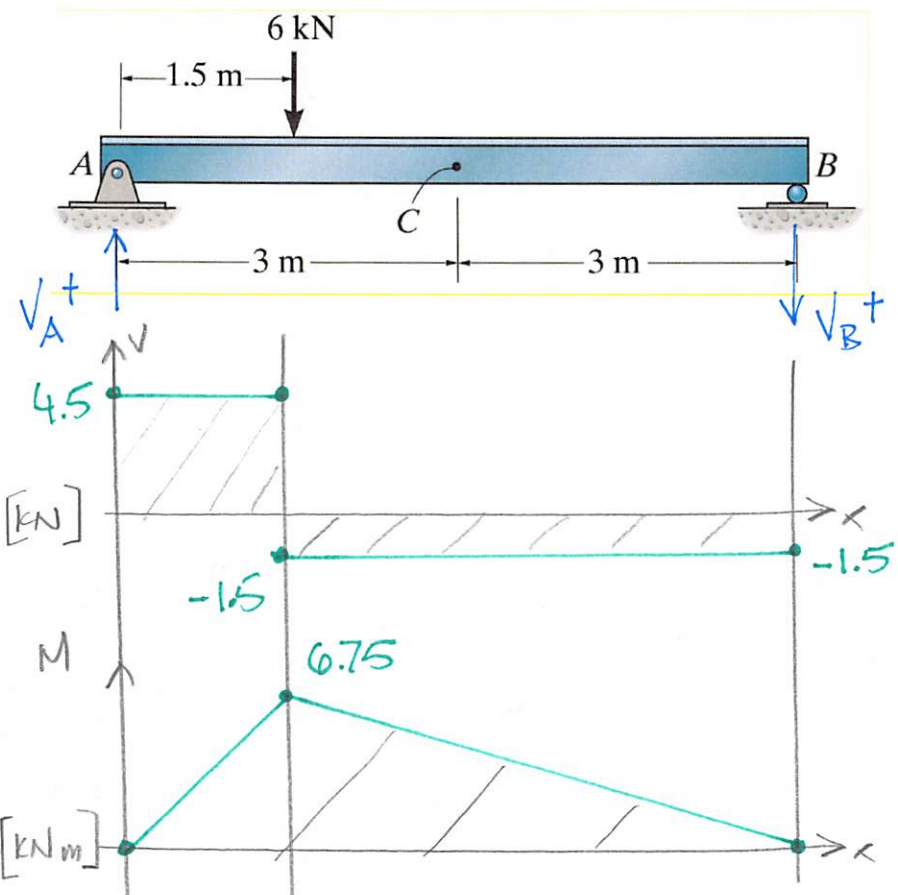


Example 7b-3: Determine the slope and the displacement at C on the beam. Assume that EI is constant.

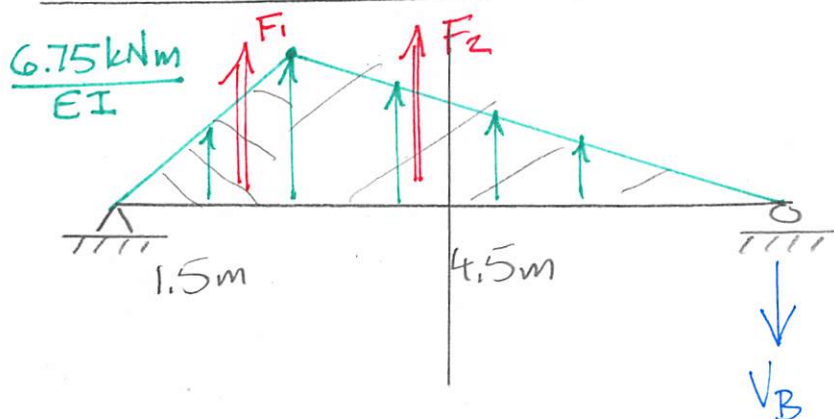


$$\sum M_B = 0 = 6\text{ kN}(4.5\text{ m}) - V_A(6\text{ m}) \quad \underline{V_A = 4.5\text{ kN}}$$

$$\sum F_y = 0 = V_A - V_B - 6\text{ kN}$$

$$\underline{V_B = -1.5\text{ kN}}$$

CONJUGATE BEAM



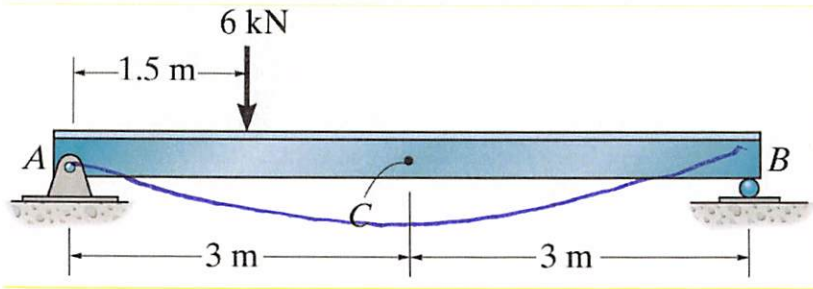
$$F_1 = \frac{1}{2}(1.5\text{ m}) \frac{6.75\text{ kNm}}{EI} = \frac{5.0625\text{ kNm}^2}{EI}$$

$$F_2 = \frac{1}{2}(4.5\text{ m}) \frac{6.75\text{ kNm}}{EI} = \frac{15.1875\text{ kNm}^2}{EI}$$

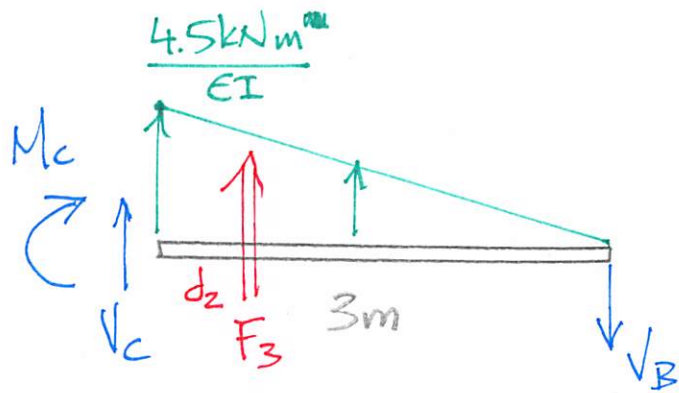
$$d_1 = \frac{2}{3}(1.5\text{ m}) = 1\text{ m}$$

$$d_2 = 1.5\text{ m} + \frac{1}{3}(4.5\text{ m}) = 3\text{ m}$$

Example 7b-3: Determine the slope and the displacement at C on the beam. Assume that EI is constant.



$$\sum M_A = 0 = F_1 d_1 + F_2 d_2 - V_B (6m) \quad V_B = \frac{8.4375 \text{ kNm}^2}{EI}$$



$$F_3 = \frac{1}{2} (3m) \frac{4.5 \text{ kNm}}{EI} = \frac{6.75 \text{ kNm}^2}{EI}$$

$$d_3 = \frac{1}{3} (3m) = 1m$$

$$\sum M_{cut} = 0 = -M_C + F_3 d_3 - V_B (3m)$$

$$M_C = -\frac{18.5625 \text{ kNm}^3}{EI} \Rightarrow \theta_C$$

$$\sum F_y = 0 = V_C + F_3 - V_B$$

$$V_C = \frac{1.6875 \text{ kNm}^2}{EI} \Rightarrow \theta_C$$