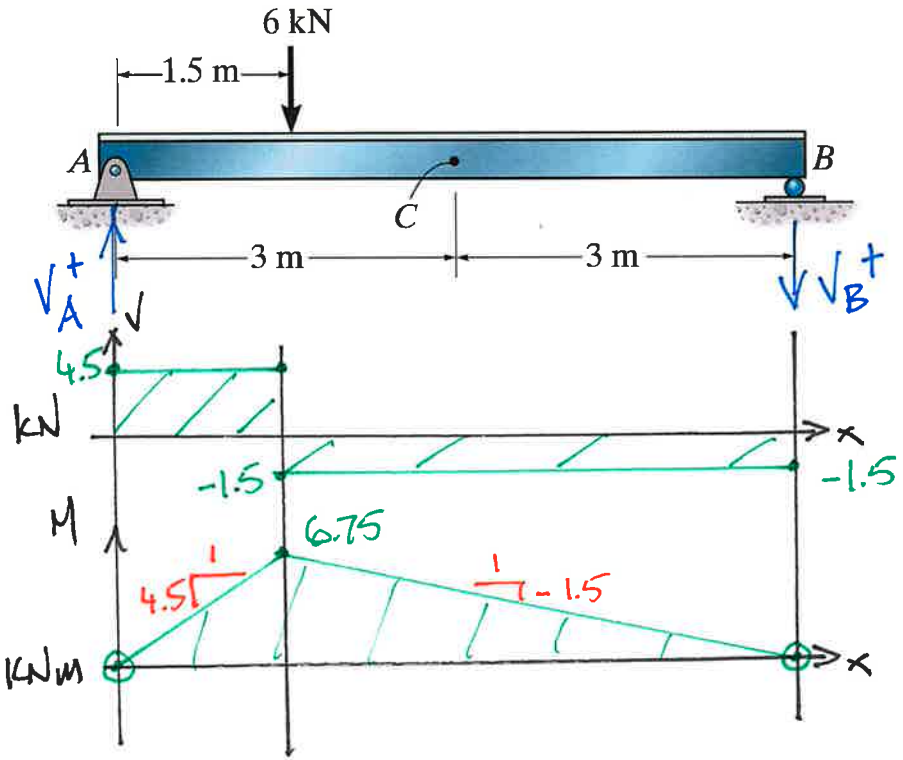
Example 7b-3: Determine the slope and the displacement at *C* the beam. Assume that *EI* is constant.



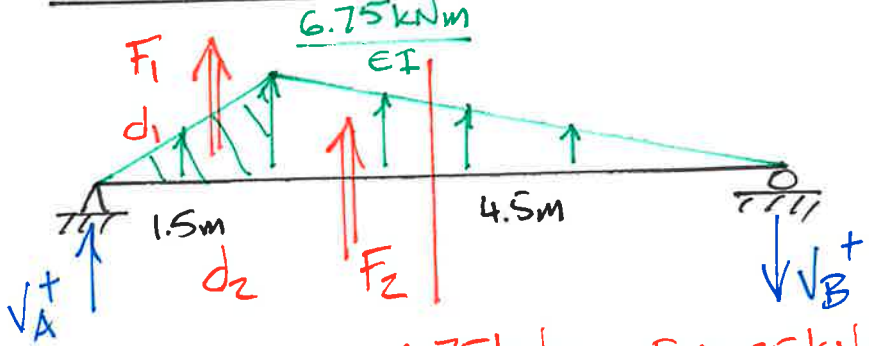
$$\circlearrowleft + \sum M_B = 0 = 6\text{kN}(4.5\text{m}) - V_A(6\text{m}) \qquad V_A = 4.5\text{kN}$$

$$+\uparrow \sum F_y = 0 = V_A - V_B - 6\text{kN} \qquad V_B = -1.5\text{kN}$$

$$\circlearrowleft + \sum M_A = 0 = F_1 d_1 + F_2 d_2 - V_B(6\text{m})$$

$$V_B = \frac{8.4375\,\text{kNm}^2}{EI}$$

CONJUGATE BEAM

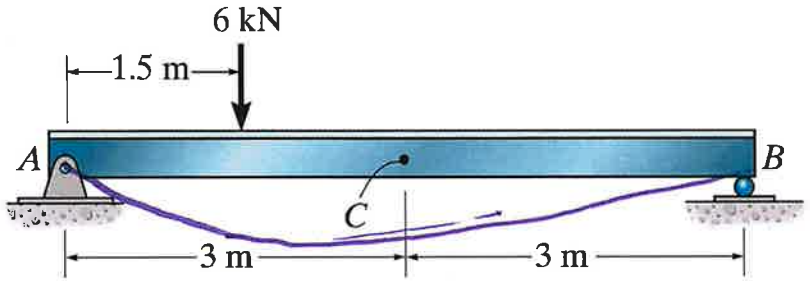


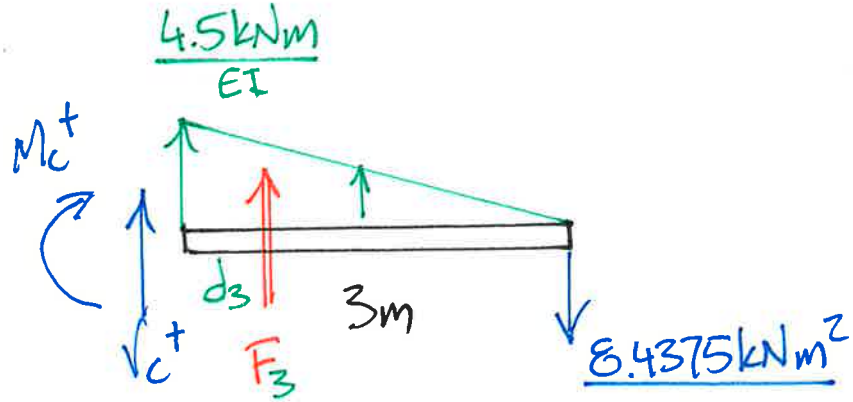
$$F_1 = \tfrac{1}{2}(1.5\text{m})\frac{6.75\text{kNm}}{EI} = \frac{5.0625\,\text{kNm}^2}{EI}$$

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

$$d_1 = \tfrac{2}{2}(1.5\text{m}) = 1\text{m} \qquad d_2 = 1.5 + \tfrac{1}{3}(4.5) = 3\text{m}$$

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





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

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

$$\curvearrowleft + \Sigma M_C = 0 = -M_C + F_3 d_3 - \frac{8.4375\,kNm^2}{EI}(3m)$$

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

$$+\uparrow \Sigma F_y = 0 = V_C + F_3 - \frac{8.4375\,kNm^2}{EI}$$

$$V_C = \frac{1.6875\,kNm^2}{EI} \Rightarrow \Theta_C$$