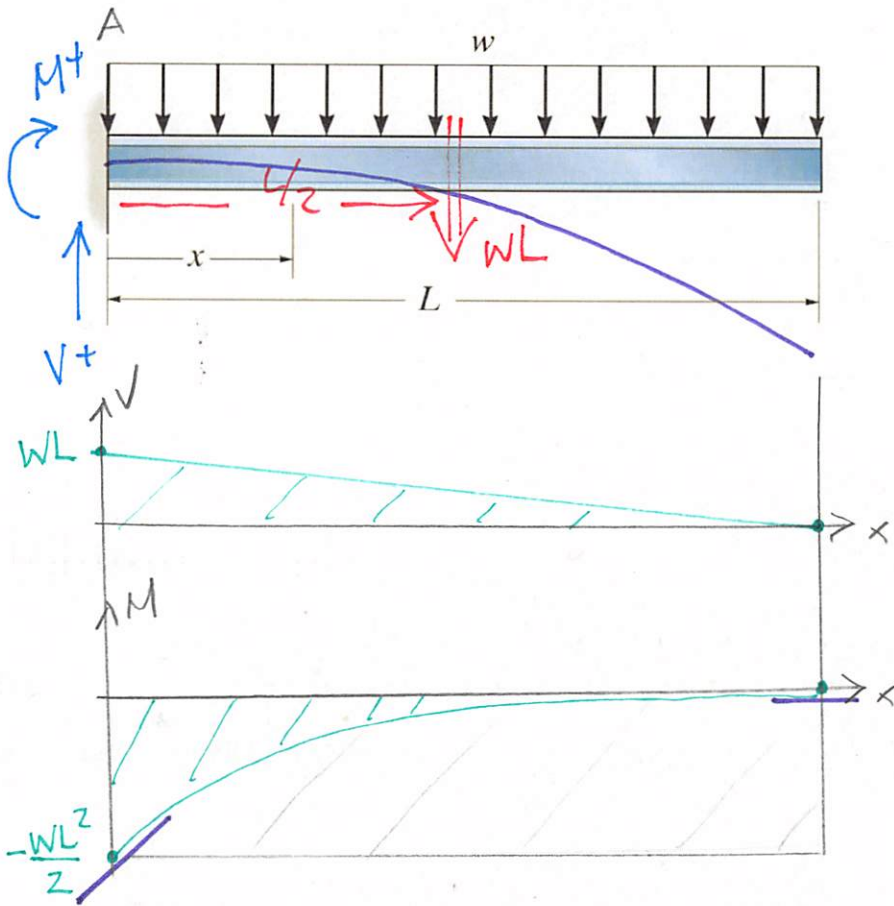
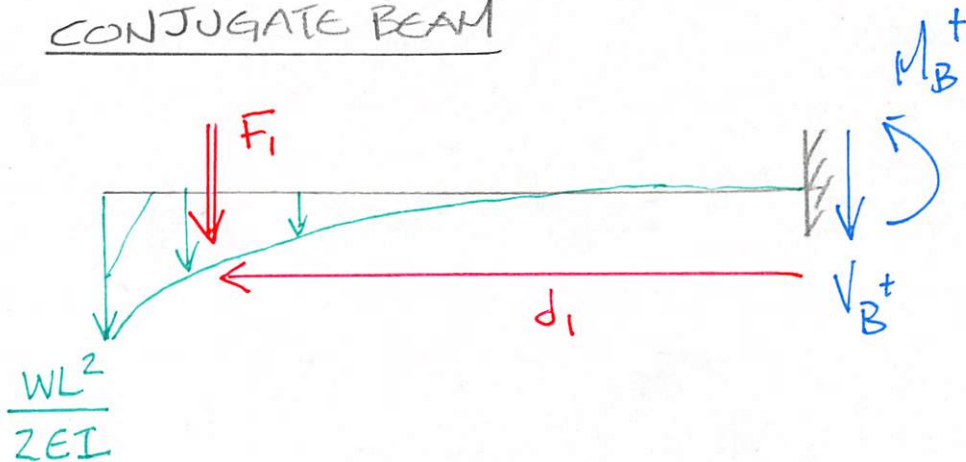


Example 7b-7: Use the conjugate beam method to determine the slope and displacement at the free end. Assume that EI is constant.



CONJUGATE BEAM



$$\sum M_A = 0 = -WL\left(\frac{L}{2}\right) - M_A \quad \underline{M_A = -\frac{WL^2}{2}}$$

$$+\uparrow \sum F_y = 0 = V_A - WL \quad \underline{V_A = WL}$$

$$F_1 = \frac{1}{3}(L) \frac{WL^2}{2EI} = \frac{WL^3}{6EI}$$

$$d_1 = \frac{3}{4}(L)$$

$$\sum M_B = 0 = M_B + F_1 d_1$$

$$\underline{M_B = -\frac{WL^4}{8EI} \Rightarrow \theta_B}$$

$$+\uparrow \sum F_y = 0 = -V_B - F_1$$

$$\underline{V_B = -\frac{WL^3}{6EI} \Rightarrow \Delta_B}$$