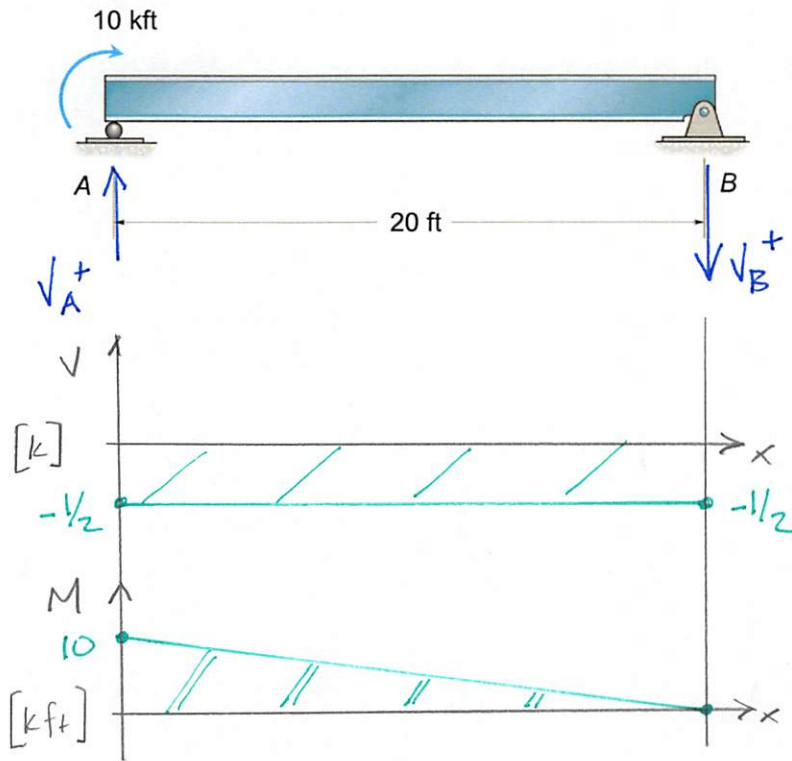


Use the conjugate beam method to determine the mid-span displacement and the slope at B for the beam below. EI is constant.



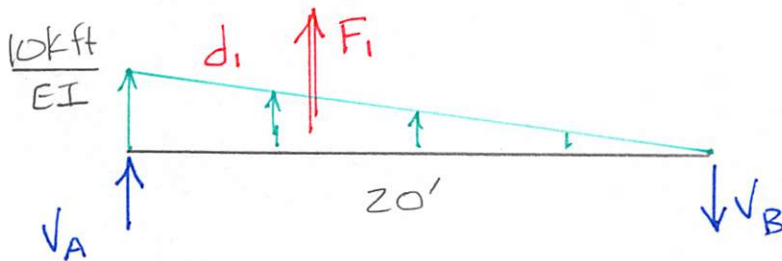
$$\sum M_B = 0 = -10kft - V_A(20')$$

$$V_A = -1/2 k$$

$$\sum F_y = 0 = V_A - V_B$$

$$V_B = -1/2 k$$

CONJUGATE BEAM



$$\sum M_A = 0 = F_1 d_1 - V_B(20')$$

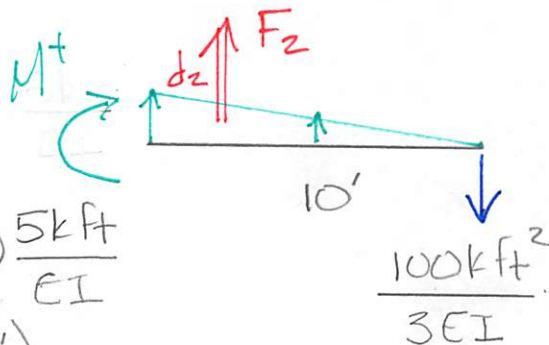
$$V_B = \frac{100kft^2}{3EI} \Rightarrow \theta_B$$

$$F_1 = \frac{1}{2}(20') \frac{10kft}{EI} = \frac{100kft^2}{EI}$$

$$d_1 = \frac{1}{3}(20') = \frac{20'}{3}$$

$$\sum M_{cut} = 0 = -M + F_2 d_2 - \frac{100kft^2}{3EI}(10')$$

$$M = -\frac{250kft^3}{EI} \Rightarrow y_{MP}$$



$$F_2 = \frac{1}{2}(10') \frac{5kft}{EI}$$

$$d_2 = \frac{1}{3}(10')$$