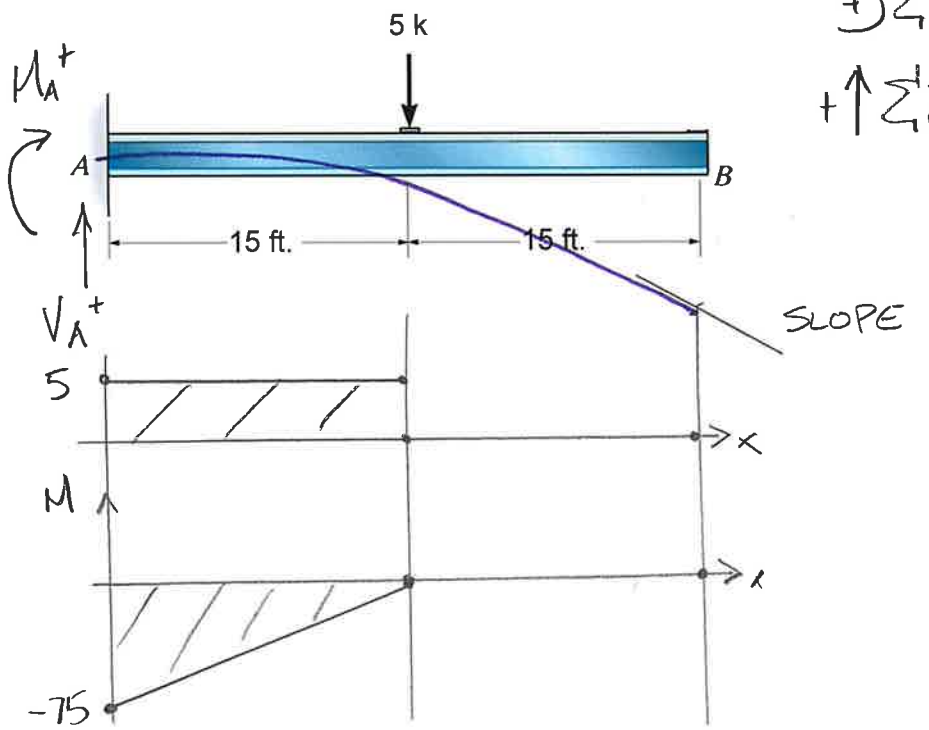
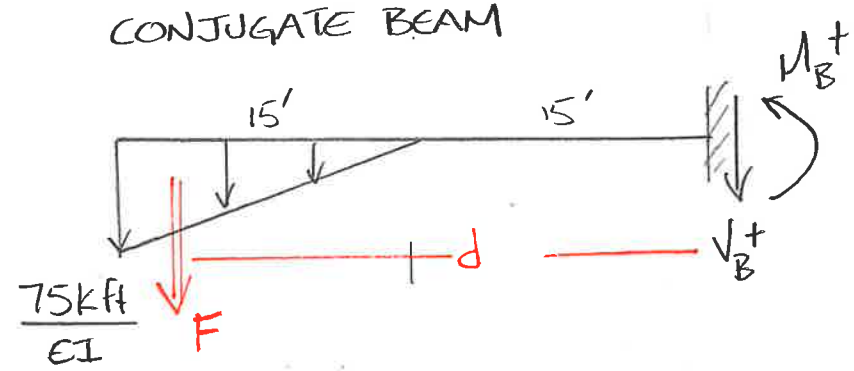
Example 7b-1: Determine the slope and the displacement at point B for the beam.
Assume that E = 30,000 ksi and I = 800 in^4.



$$\circlearrowleft +\Sigma M_A = 0 = -M_A - 5k(15ft) \qquad M_A = -75\,k\text{-}ft$$

$$+\uparrow \Sigma F_Y = 0 = V_A - 5k \qquad V_A = 5k$$

$$\frac{1}{k/in^2} = \frac{in^2}{k}$$



$$+\uparrow \Sigma F_Y = 0 = -V_B - F \qquad \theta_B = -F = -\frac{562.5\,k\text{-}ft^2}{EI}$$

$$\theta_B = -\frac{562.5\,k\text{-}ft^2}{30{,}000\,k} \left|\frac{in^2}{800\,in^4}\right| \frac{(12\,in)^2}{1\,ft^2}$$

$$= -0.0034 \text{ RADIANS}$$

$$\circlearrowleft +\Sigma M_B = 0 = M_B + Fd \qquad y_B = -Fd$$

$$y_B = -\frac{14{,}062.5\,k\text{-}ft^3}{30{,}000\,k} \left|\frac{in^2}{800\,in^4}\right| \frac{(12\,in)^3}{ft^3}$$

$$= -1.01\,in$$

$$F = \tfrac{1}{2}(15ft)\frac{75\,k\text{-}ft}{EI} = \frac{562.5\,k\text{-}ft^2}{EI}$$

$$d = 15' + \tfrac{2}{3}(15') = 25ft$$