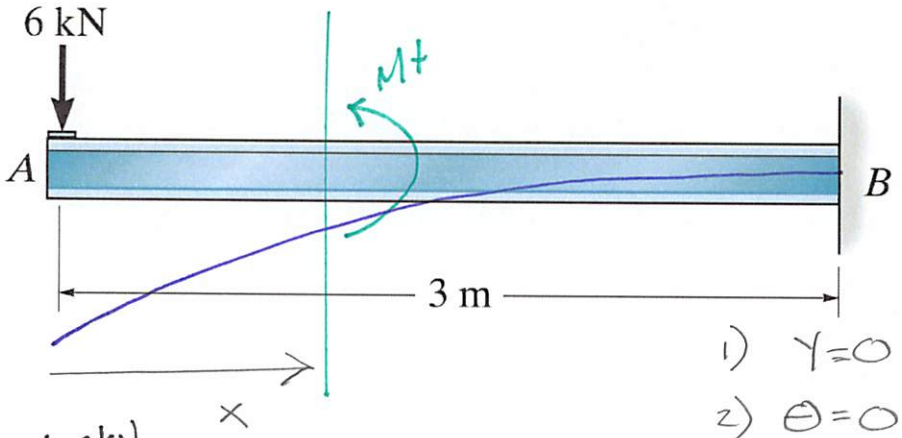
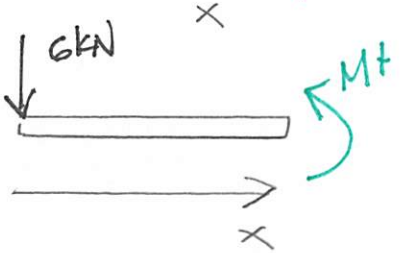
Example 7a-5: Determine the equations for slope and displacement in the following beam.



1) $Y=0$

2) $\theta=0$

$$[EI] = \frac{F}{L^2}L^4 = FL^2$$



$$\circlearrowleft + \sum M_{CUT} = 0 = M + 6\,kN(x) \qquad M(x) = [-6x]\,kN\,m$$

$$\theta = \int \frac{M}{EI}dx = \frac{6}{EI}\left[-\frac{x^2}{2}\right] + C_1$$

$$\theta(x=3m) = 0 = \frac{6\,kN}{EI}\left[-\frac{(3m)^2}{2}\right] + C_1$$

$$C_1 = \frac{27\,kN\,m^2}{EI}$$

$$Y = \int \theta\,dx = \frac{6}{EI}\left[-\frac{x^3}{6}\right] + C_1 x + C_2$$

$$Y(x=3m) = 0 = \frac{6}{EI}\left[-\frac{(3m)^3}{6}\right] + \frac{27\,kN\,m^2}{EI}(3m) + C_2$$

$$C_2 = -\frac{54\,kN\,m^3}{EI}$$