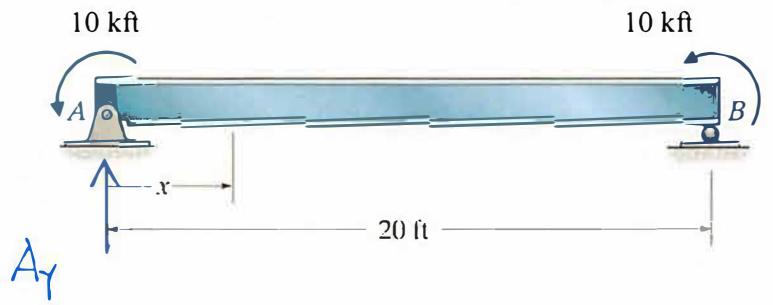
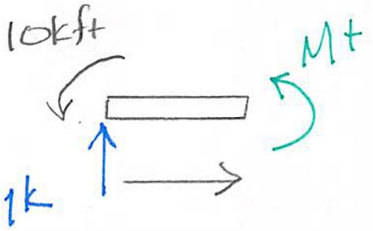
CIVL 3121 Quiz #6 S26 Name: _____

Determine the equation of the elastic curve for the beam using the x coordinate valid for $0 \le x \le 20$ ft. Assume EI is constant.



$$\circlearrowleft + \sum M_B = 0 = 10\,\text{kft} + 10\,\text{kft} - A_y(20')$$

$$A_y = 1\,\text{k}$$



$$\circlearrowleft + \sum M_{cut} = 0 = M - 1\text{k}\,x + 10\,\text{kft}$$

$$M = [x - 10]\,\text{kft}$$

$$EI\theta = \int M\,dx = \frac{x^2}{2} - 10x + C_1$$

$$y = \int \theta\,dx = \frac{1}{EI}\left[\frac{x^3}{6} - 5x^2\right] + C_1 x + C_2$$

$$y(x=0) = 0 = C_2$$

$$y(x=20\,\text{ft}) = 0 = \frac{1}{EI}\left[-\frac{2000\,\text{kft}^3}{3}\right] + C_1(20')$$

$$C_1 = \frac{100\,\text{kft}^2}{3EI}$$