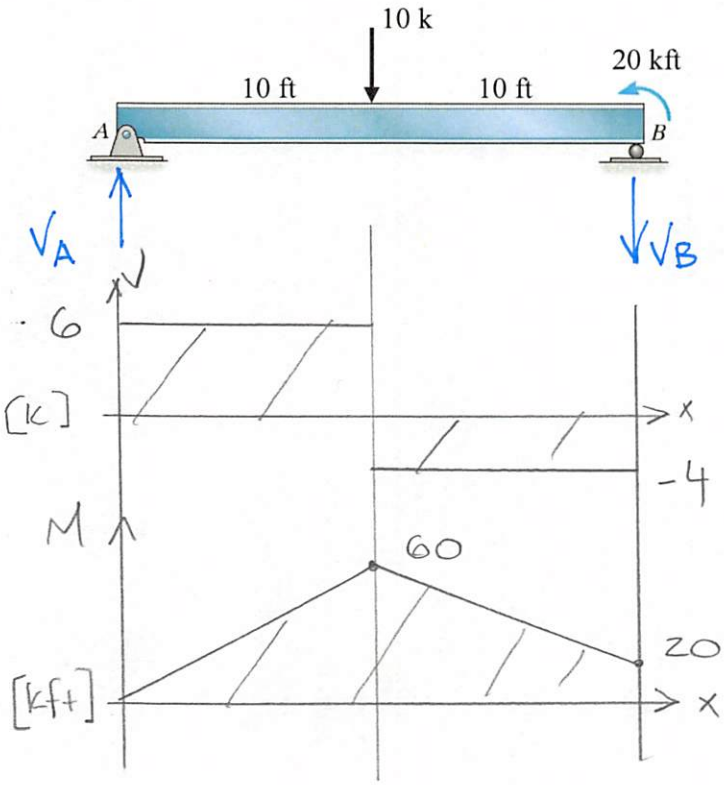
CIVL 3121 Quiz #7 F25 Name: _____

Use the conjugate beam method to determine the slope at *A* for the beam shown below. Assume *EI* is constant.



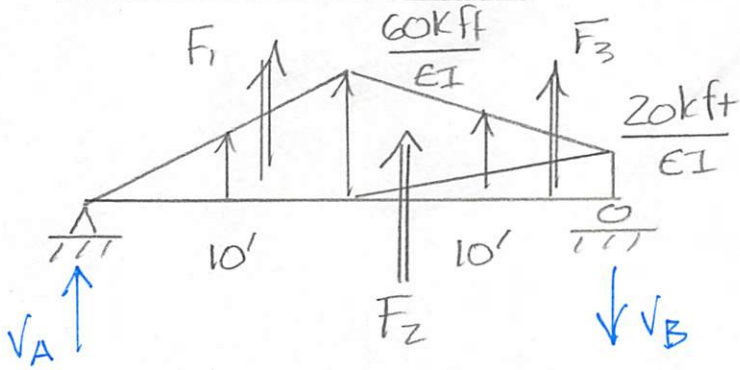
$$\circlearrowleft + \sum M_B = 0 = 20\,kft + 10^k(10') - V_A(20')$$

$$\underline{V_A = 6^k}$$

$$+\uparrow \sum F_y = 0 = V_A - V_B - 10^k$$

$$\underline{V_B = -4^k}$$

CONJUGATE BEAM



$$\circlearrowleft + \sum M_B = 0 = -F_1 d - F_2 d_2 - F_3 d_3 - V_A(20')$$

$$V_A = -\frac{316.67\,kft^2}{EI}$$

$$F_1 = \frac{1}{2}(10')\frac{60kft}{EI} = \frac{300kft^2}{EI}$$

$$F_2 = \frac{1}{2}(10')\frac{60kft}{EI} = \frac{300kft^2}{EI}$$

$$F_3 = \frac{1}{2}(10')\frac{20kft}{EI} = \frac{100kft^2}{EI}$$

$$d_1 = 10 + \tfrac{1}{3}(10) = \frac{40'}{3}$$

$$d_2 = \tfrac{2}{3}(10') = \frac{20'}{3}$$

$$d_3 = \tfrac{1}{3}(10) = \frac{10'}{3}$$