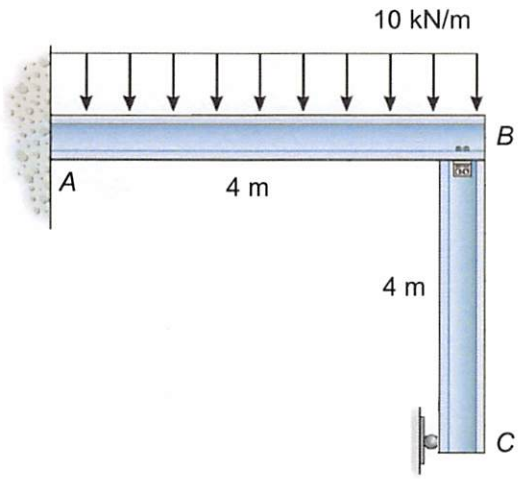
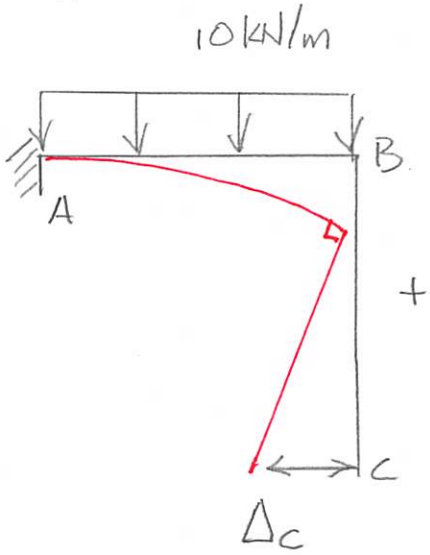
CIVL 4122 Quiz #2 F26 Name: _____

Determine the reaction at the roller support *C*. Support *A* is a fixed connection.





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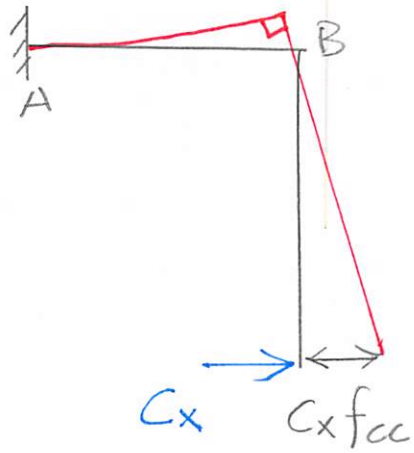
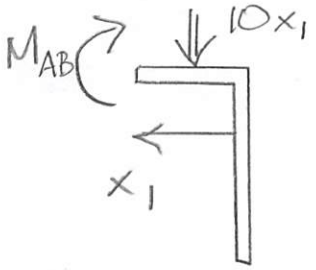


$$* \Delta_C + C_x f_{cc} = 0$$

VIRTUAL WORK – REAL MOMENTS*

SECTION AB



$$\curvearrowleft \sum M_{CUT} = 0$$

$$= -M_{AB} - 10x_1\left(\frac{x_1}{2}\right)$$

$$M_{AB} = -5x_1^2$$

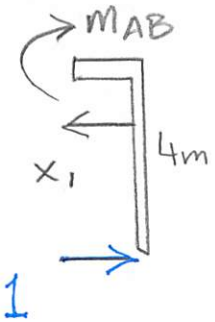
SECTION BC

$$\curvearrowleft \sum M_{CUT} = 0$$

$$= M_{BC} = 0$$

VIRTUAL MOMENTS*

SECTION AB

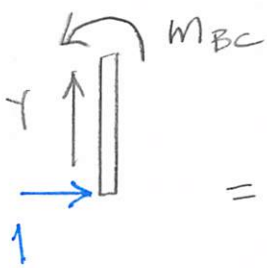


$$\curvearrowleft \sum M_{CUT} = 0$$

$$= -m_{AB} + 1(4m)$$

$$m_{AB} = 4m$$

SECTION BC



$$\curvearrowleft \sum M_{CUT} = 0$$

$$= m_{BC} - 1y$$

$$m_{BC} = y$$

$$EI\Delta_c = \int_0^4 M_{AB} m_{AB}\, dx_1 = \int_0^4 (-5x_1^2)(4)\, dx_1$$

$$= -\frac{20x_1^3}{3}\Big|_0^4 = -\frac{1{,}280\ kN m^3}{3}$$

$$EIf_{cc} = \int_0^4 m_{AB} m_{AB}\, dx_1 + \int_0^4 m_{BC} m_{BC}\, dy$$

$$= \int_0^4 (4)^2 dx_1 + \int_0^4 (y)^2 dx = 16x_1\Big|_0^4 + \frac{y^3}{3}\Big|_0^4$$

$$= \left[64 + \frac{64}{3}\right] m^3 = \frac{256\ m^3}{3}$$

$$\Delta_c + C_x f_{cc} = -\frac{1{,}280\ kN m^3}{3} + C_x\left(\frac{256\ m^3}{3}\right)$$

$$\underline{\underline{C_x = 5\ kN}}$$