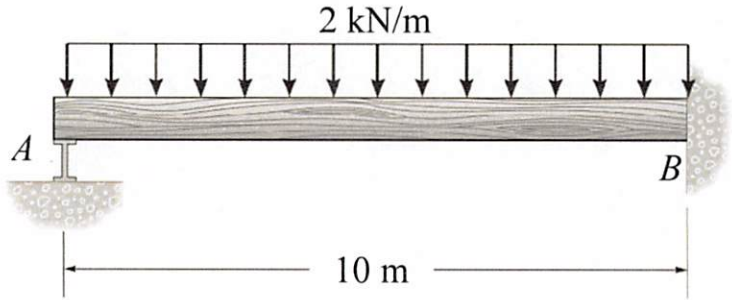
Problem 9a-2 – Compute the reactions and draw the shear and moment curves for the following beam.



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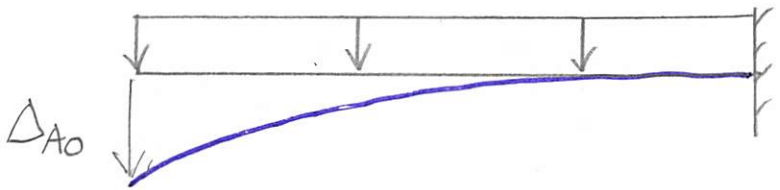

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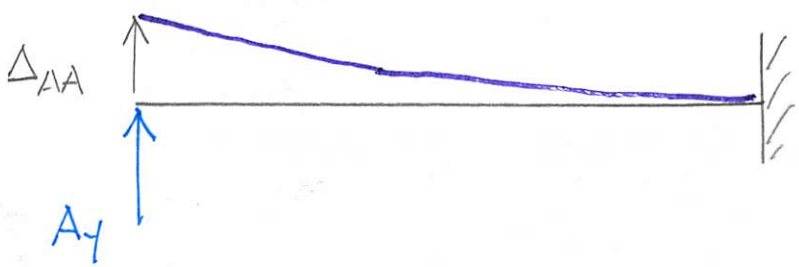


$$\Delta_{AA} = A_y f_{AA}$$

$$\Delta_A = 0 = \Delta_{Ao} + \Delta_{AA} \qquad \frac{FL^3}{\frac{F}{L^2}L^4} = L$$

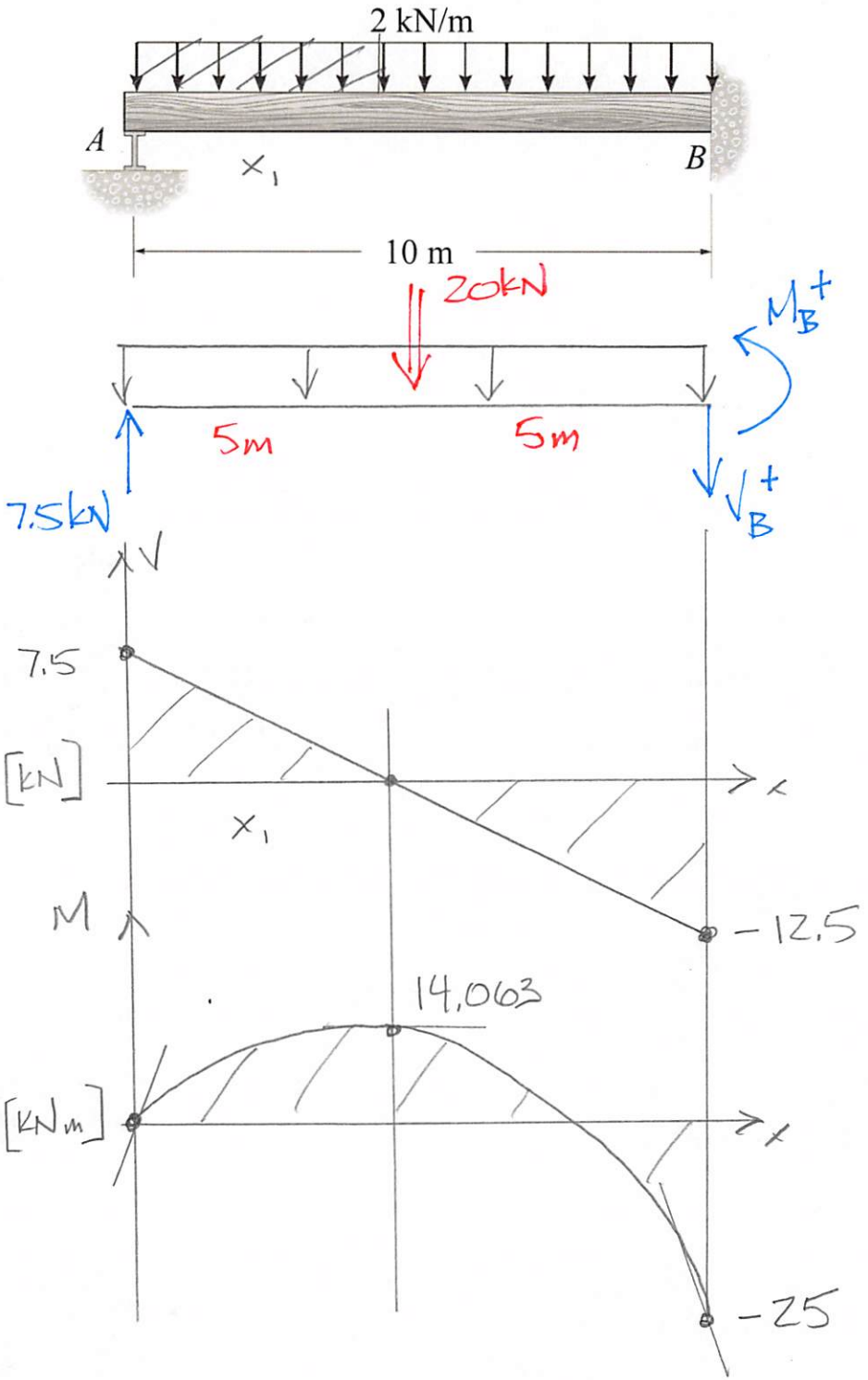
$$\Delta_{Ao} = -\frac{WL^4}{8EI} = -\frac{(2kN/m)(10m)^4}{8EI} = -\frac{2{,}500 kNm^3}{EI}$$

$$f_{AA} = \frac{L^3}{3EI} = \frac{(10m)^3}{3EI} = \frac{1{,}000 m^3}{3EI} \qquad \frac{L^3}{\frac{F}{L^2}L^4} = \frac{L}{F}$$

$$-\frac{2{,}500 kNm^3}{EI} + A_y \frac{1{,}000 m^3}{3EI} = 0$$

$$A_y = 7.5 kN$$

Problem 9a-2 – Compute the reactions and draw the shear and moment curves for the following beam.



$$\circlearrowleft^+ \sum M_B = 0 = M_B + 20kN(5m) - 7.5kN(10m)$$

$$\underline{M_B = -25kNm}$$

$$+\uparrow \sum F_y = 0 = -V_B - 20kN + 7.5kN$$

$$\underline{V_B = -12.5kN}$$

$$\Delta V = \int w\,dx \quad \checkmark \qquad \frac{dV}{dx} = w$$

$$-7.5kN = -2x_1 \Rightarrow x_1 = 3.75\,m$$

$$\Delta M = \int V\,dx \qquad \frac{dM}{dx} = V$$