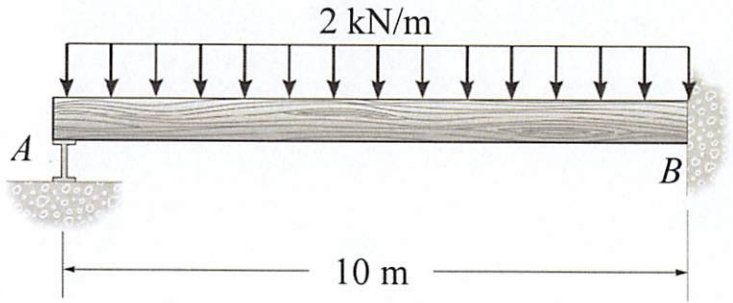
Problem 9a-2 – Compute the reactions and draw the shear and moment curves for the following beam.



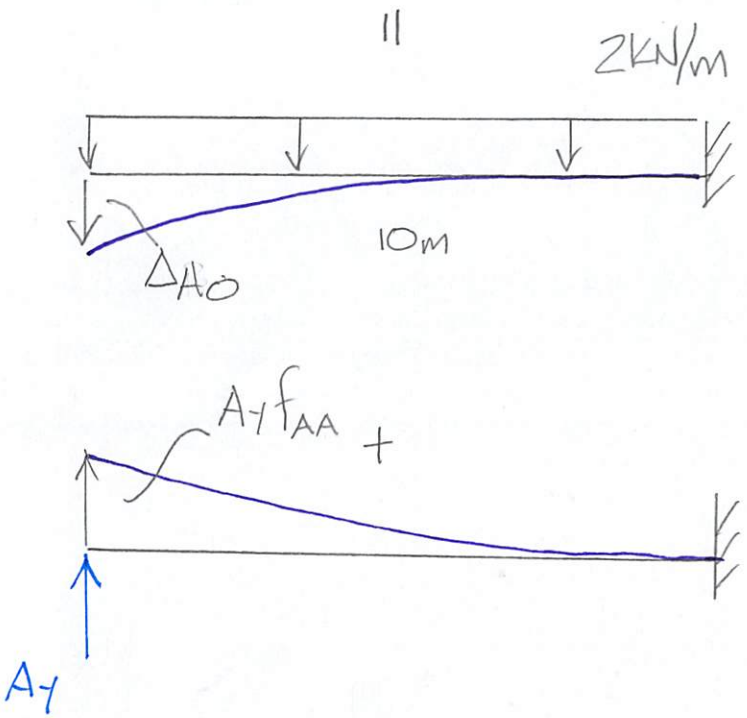
$$\Delta_{A_0} + A_y f_{AA} = 0$$

$$\Delta_{A_0} = -\frac{WL^4}{8EI} = -\frac{(2kN/m)(10m)^4}{8EI} = -\frac{2{,}500\,kNm^3}{EI}$$

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

$$\Rightarrow -\frac{2{,}500\,kN\,m^3}{EI} + \frac{1{,}000\,m^3}{3EI}(A_y) = 0$$

$$A_y = 7.5\,kN$$



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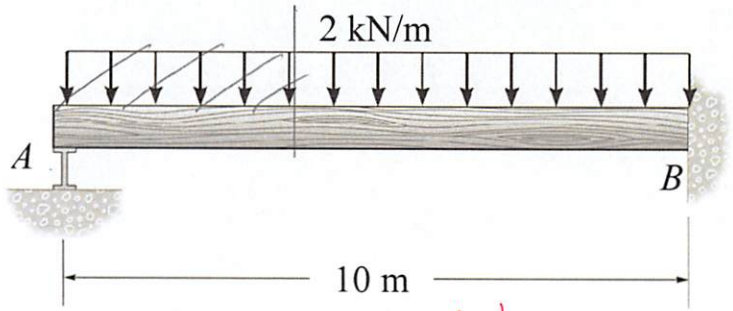
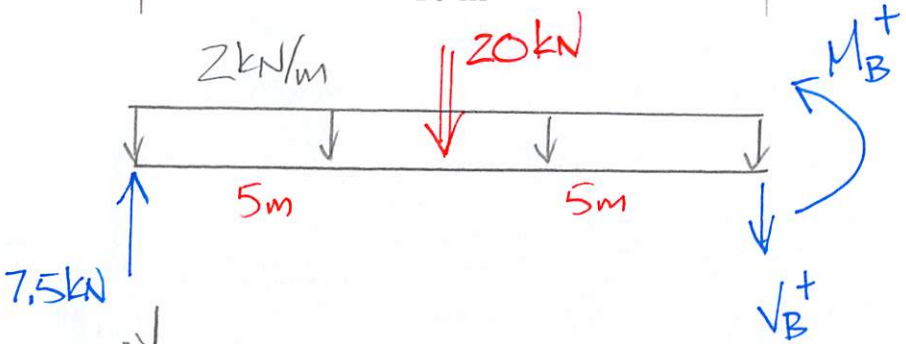


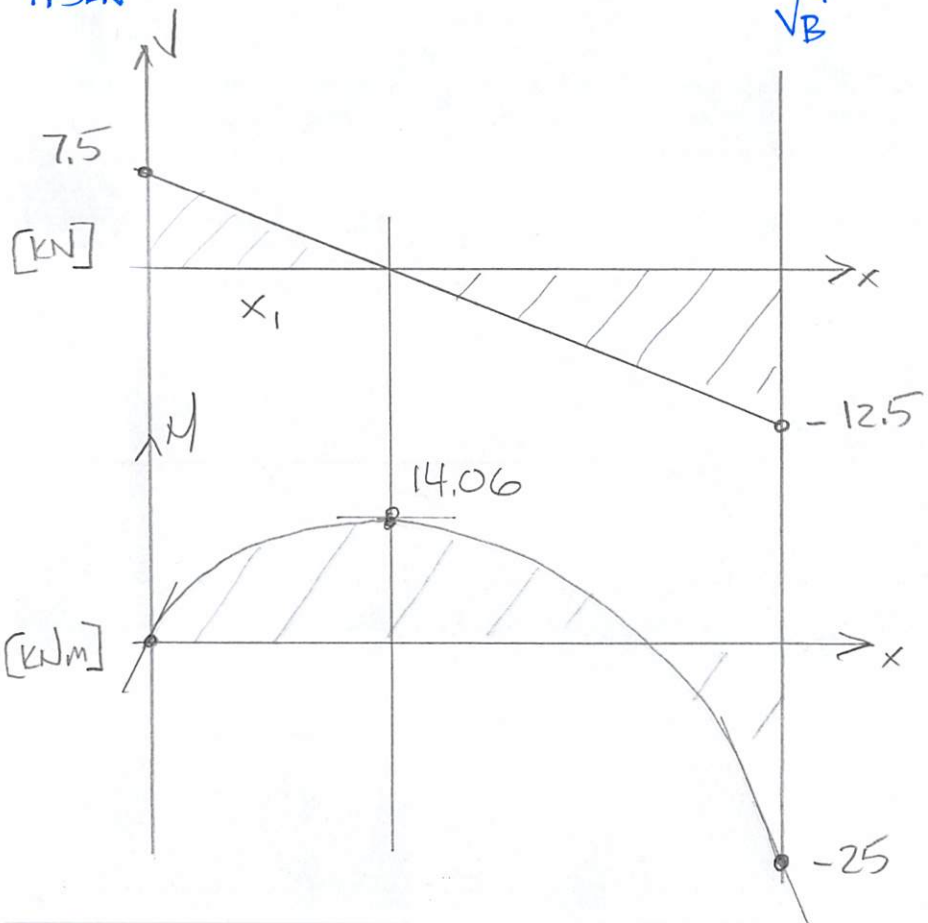


$$\circlearrowleft^{+} \sum M_B = 0 = M_B + 20\text{kN}(5\text{m}) - 7.5\text{kN}(10\text{m})$$

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

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

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



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

$$-7.5\text{kN} = -2x_1 \Rightarrow x_1 = 3.75\text{m}$$

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