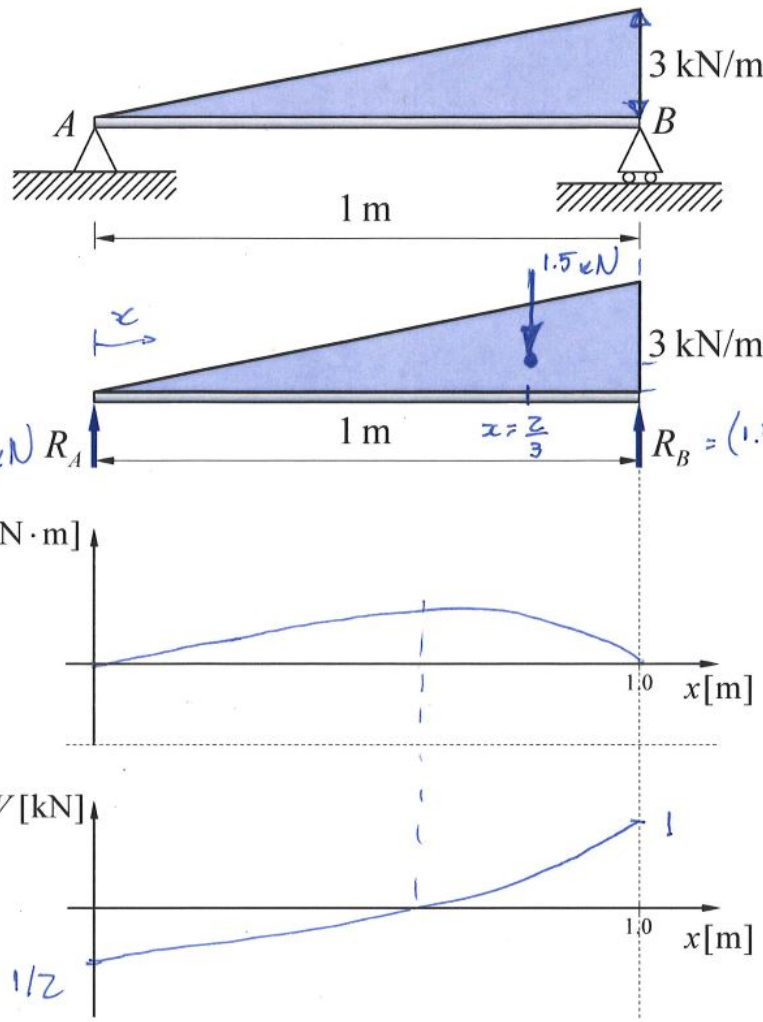
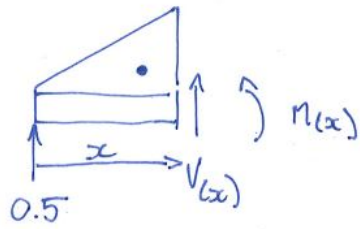
Example 2.5 – Plot the bending moment and shear force diagrams for the following simply-supported beam:





area of $\triangle$ ↓ moment arm ↓

$$\sum M_x^{ccw} = 0 \quad \therefore \quad M(x) + \left[\frac{(x)(3x)}{2}\right]\left(\frac{x}{3}\right) - \left(\frac{1}{2}\right)x = 0$$

$$M(x) = -\frac{3}{2}x^2 \cdot \left(\frac{x}{3}\right) + \frac{x}{2}$$

$$\boxed{M(x) = -\frac{x^3}{2} + \frac{x}{2}}$$

$$\sum F_y = 0$$

area $\triangle$ ↓

$$V(x) - \left(\frac{3}{2}x^2\right) + \frac{1}{2} = 0$$

$$\boxed{V(x) = \frac{3}{2}x^2 - \frac{1}{2}}$$