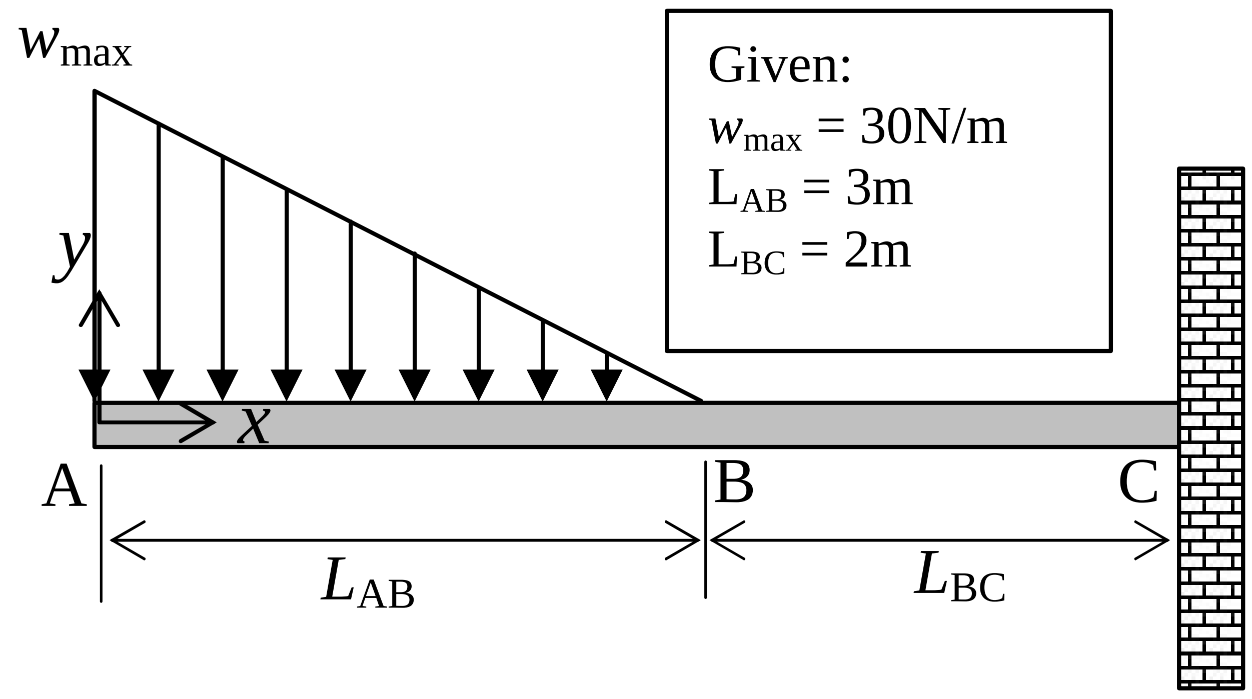
Find the shear force and bending moments in the beam having the loading shown.



First, find $w_{AB}(x)$: $w_{AB}(x) = w_{max}(1 - x/L_{AB})$

Finding the shear force for section AB:

$$V_{AB}(x) - \cancel{V_A} = -\int_{x'=0}^{x} w_{max}\left(1-\frac{x'}{L_{AB}}\right)dx'$$

$$V_{AB}(x) = -w_{max}\left(x' - \frac{x'^2}{2L_{AB}}\right)\Bigg|_{x'=0}^{x'=x} = \boxed{V_{AB}(x) = -w_{max}\left(x - \frac{x^2}{2L_{AB}}\right)}$$

Evaluate this at point B: $V_B = -w_{max}\left(L_{AB} - \frac{L_{AB}^2}{2L_{AB}}\right) = \frac{-w_{max}L_{AB}}{2}$ → $\boxed{V_B = -45\text{N}}$

Finding the shear force for section AB. In this region, $w = 0$:

$$V_{BC}(x) - V_B = -\int_{x'=L_{AB}}^{x} 0\ dx' = 0,\ \text{so}\ \boxed{V_{BC}(x) = \frac{-w_{max}L_{AB}}{2}}$$

Finding the bending moment for section AB:

$$M_{AB}(x) - \cancel{M_A} = \int_{x'=0}^{x} V_{AB}dx' = \int_{x'=0}^{x} -w_{max}\left(x' - \frac{x'^2}{2L_{AB}}\right)dx' = -w_{max}\left(\frac{x'^2}{2} - \frac{x'^3}{6L_{AB}}\right)\Bigg|_{x'=0}^{x} \rightarrow \boxed{M_{AB}(x) = -w_{max}\left(\frac{x^2}{2} - \frac{x^3}{6L_{AB}}\right)}$$

Evaluate this at point B: $M_B = -w_{max}\left(\frac{L_{AB}^2}{2} - \frac{L_{AB}^3}{6L_{AB}}\right) = \frac{-w_{max}L_{AB}^2}{3}$ → $\boxed{M_B = -90\text{Nm}}$

Finding the bending moment for section BC:

$$M_{BC}(x) - M_B = \int_{x'=L_{AB}}^{x} V_{BC}dx' = \int_{x'=L_{AB}}^{x} -w_{max}\frac{L_{AB}}{2}dx' = -\frac{w_{max}L_{AB}x'}{2}\Bigg|_{x'=L_{AB}}^{x} = -\frac{w_{max}L_{AB}x}{2} - \frac{-w_{max}L_{AB}^2}{2} = -\frac{w_{max}L_{AB}(x-L_{AB})}{2}$$

$$M_{BC}(x) = \frac{-w_{max}L_{AB}^2}{3} - \frac{w_{max}L_{AB}(x-L_{AB})}{2} = \boxed{M_{BC}(x) = \frac{w_{max}L_{AB}}{6}(L_{AB} - 3x)}$$

The shear and bending moment diagrams are shown: