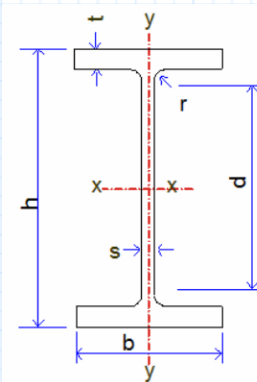


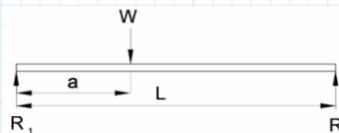
Inputs Variables

Top/Bottom thickness	$t := 20.2 \text{ mm}$
Height of I-beam	$h := 903.3 \text{ mm}$
Width of I-beam	$b := 303.3 \text{ mm}$
Vertical component thickness	$s := 15.1 \text{ mm}$
Moment of inertia	$I_x := 325253 \text{ cm}^4$
Modulus of elasticity	$E := 120 \frac{\text{kN}}{\text{mm}^2}$
Length of beam	$L := 15 \text{ m}$
Distance to applied load	$a := 5 \text{ m}$
Applied load	$W := 18 \text{ kN}$

Side View



Front View



Conditions at 1

Moment	$M_1 := 0 \text{ kN} \cdot \text{m}$	Reaction force	$R_1 := \frac{W}{L} (L - a)$
Deflection	$y_1 := 0 \text{ mm}$	Slope	$\theta_1 := \frac{-W \cdot a}{6 E \cdot I_x \cdot L} (2 L - a) (L - a)$

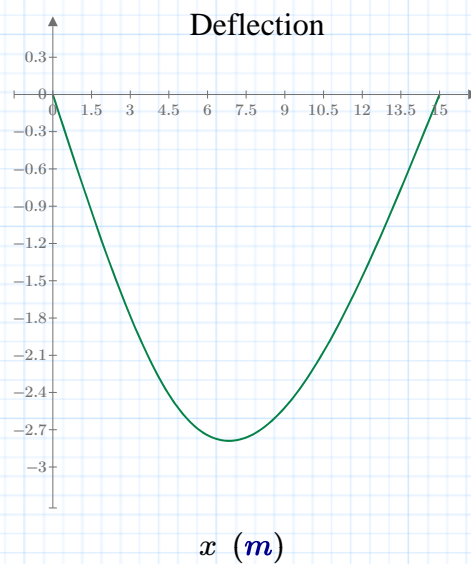
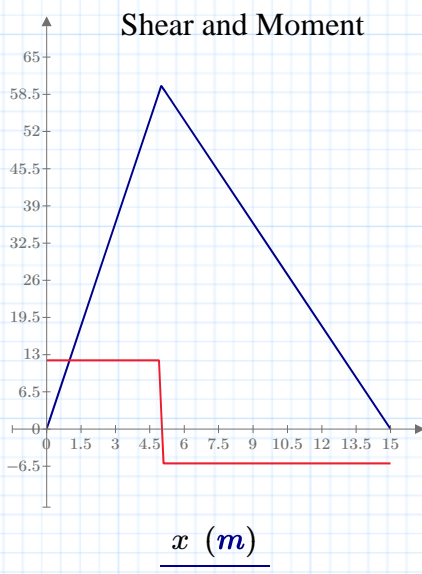
Conditions across length of beam

Deflection
$$y(x) := y_1 + \theta_1 \cdot x + \frac{M_1 \cdot x^2}{2 E \cdot I_x} + \frac{R_1 \cdot x^3}{6 E \cdot I_x} - (x > a) \left(\frac{W}{6 E \cdot I_x} (x - a)^3 \right)$$

Moment
$$M(x) := \left(\frac{d^2}{dx^2} y(x) \right) E \cdot I_x$$

Shear
$$V(x) := \left(\frac{d^3}{dx^3} y(x) \right) E \cdot I_x$$

X range variable
$$x := 0 \text{ m}, 0.1 \cdot \text{m} .. 15 \text{ m}$$



$M(x) \text{ (kN} \cdot \text{m)}$

$V(x) \text{ (kN)}$

$y(x) \text{ (mm)}$