

Beam length $L := 5 \text{ m}$

Distance between left hand end of beam and first support $a := 1 \text{ m}$

Distance between left hand end of beam and second support $b := 2.9 \text{ m} - a$

Distance between right hand end of beam and second support $c := L - (a + b) = 2.1 \text{ m}$

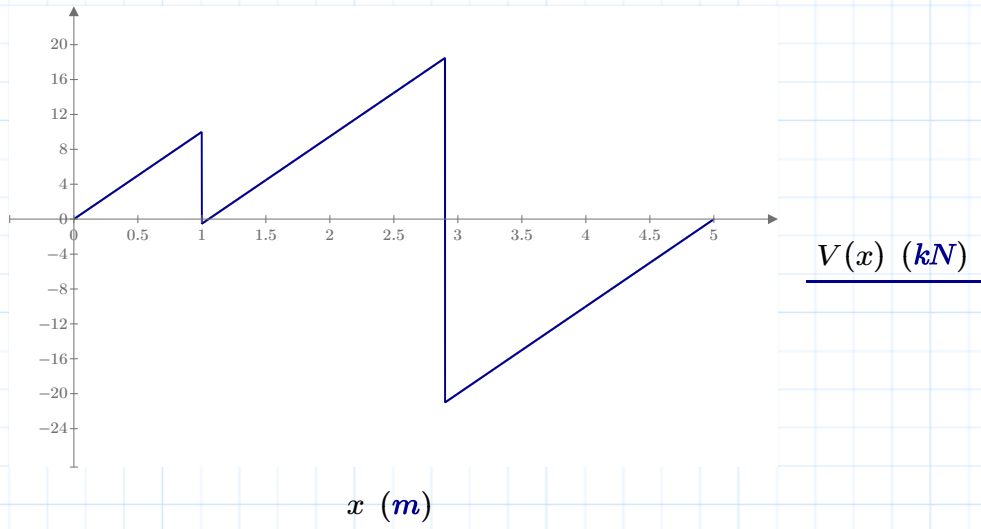
Uniformly distributed load along beam length $w := 10 \frac{\text{N}}{\text{mm}}$

Reaction force at first support $R_1 := \frac{w \cdot (a + b) \cdot \left(\frac{a + b}{2}\right) - w \cdot c \cdot \frac{c}{2}}{b} = 10.526 \text{ kN}$

Reaction force at second support $R_2 := w \cdot L - R_1 = 39.474 \text{ kN}$

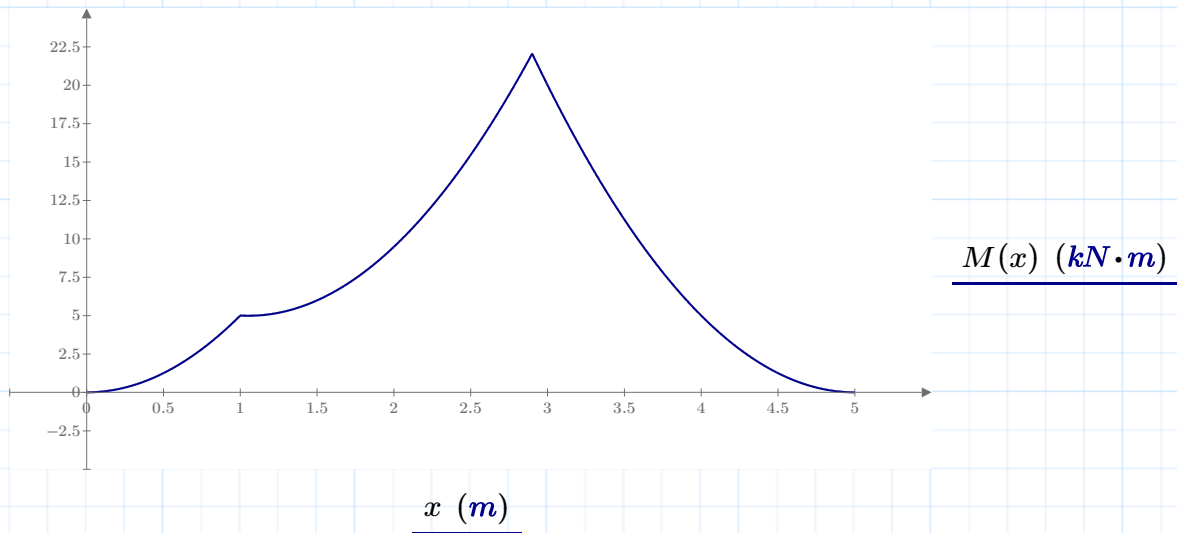
Shear Force Function $V(x) := (w \cdot x) - (R_1 \cdot (x \geq a)) - (R_2 \cdot (x \geq (a + b)))$

$x := 0, 0.001 \text{ m} \dots L$



Bending moment function

$$M(x) := \left(\frac{w \cdot x^2}{2} \right) - (R_1 \cdot (x \geq a) \cdot (x - a)) - (R_2 \cdot (x \geq (a + b)) \cdot (x - (a + b)))$$



$$M(1.0 \text{ m}) = 5 \text{ kN} \cdot \text{m}$$

$$M(2.9 \text{ m}) = 22.05 \text{ kN} \cdot \text{m}$$

Guess Value

$$x_{max_guess} := 1.5 \text{ m}$$

Point along beam where
maximum bending moment
occurs

$$x_{max} := \text{maximize}(M, x_{max_guess}) = ?$$

Maximum Bending Moment

$$M_{max} := M(x_{max}) = ? \text{ N} \cdot \text{m}$$