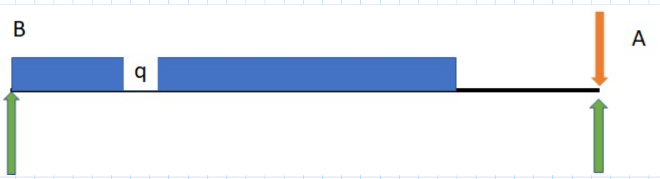
$l_1 := 4.5\ m \qquad l_2 := 2\ m \qquad q := 4\ \frac{kN}{m} \qquad F_1 := 3.2\ kN \qquad \alpha := 60\ deg$



$$\begin{bmatrix} F_{1z} \\ F_{1x} \end{bmatrix} := F_1 \cdot \begin{bmatrix} \sin(\alpha) \\ \cos(\alpha) \end{bmatrix} = \begin{bmatrix} 2.771 \\ 1.6 \end{bmatrix} kN$$

$$xx := 0\ mm, 1\ mm .. l_1 + l_2$$

$$qq(x) := q \cdot (x < l_1)$$

Calculate end loads

$$\sum M_A = 0 \qquad F_{Bz} := q \cdot l_1 \cdot \frac{\left(\frac{l_1}{2} + l_2\right)}{l_1 + l_2} = 11.769\ kN$$

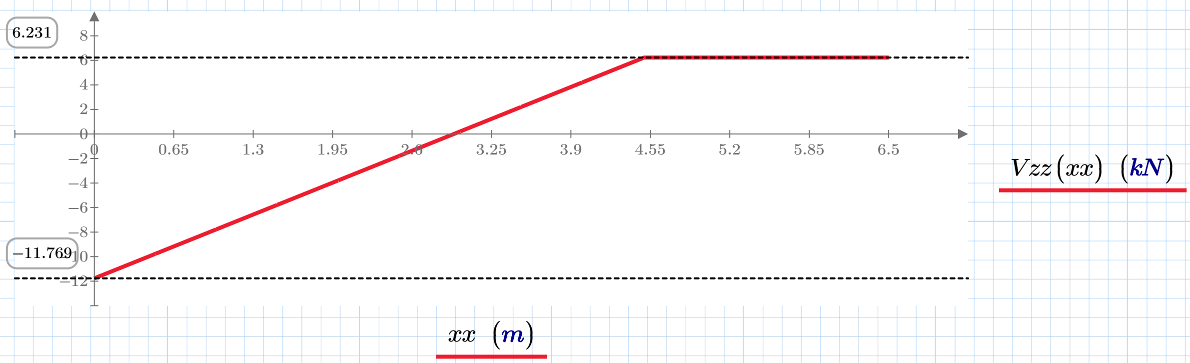
$$\sum M_B = 0 \qquad F_{Az} := q \cdot l_1 \cdot \frac{\left(\frac{l_1}{2}\right)}{l_1 + l_2} + F_{1z} = 9.002\ kN$$

check: $q \cdot l_1 + F_{1z} - (F_{Bz} + F_{Az}) = 0\ kN$

Define shear equation

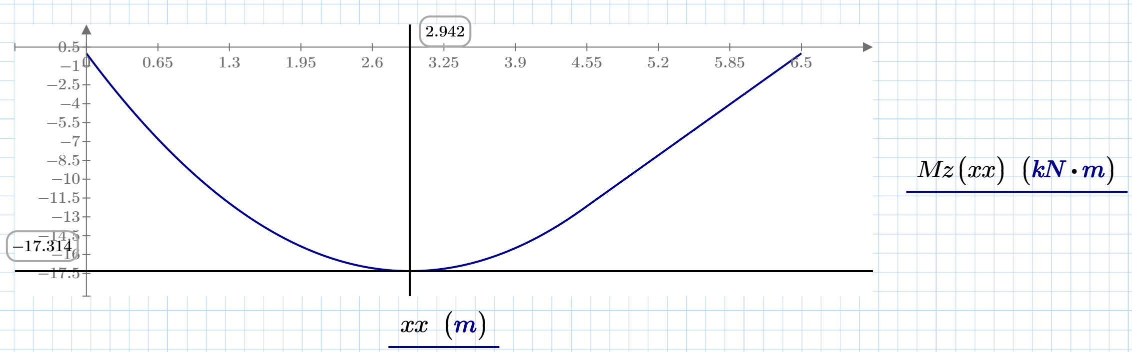
$$Vzz(x) := \begin{bmatrix} x < l_1 \\ x \geq l_1 \end{bmatrix} \cdot \begin{bmatrix} q \cdot x - F_{Bz} \\ q \cdot l_1 - F_{Bz} \end{bmatrix}$$

$$Vzz(0\ mm) = -11.769\ kN \qquad Vzz(l_1 + l_2) = 6.231\ kN$$



Calculate moment: $Mz(x) := \int_{0\ mm}^{x} Vzz(z)\, dz$

$$Mz(0\ mm) = 0\ N \cdot m \qquad Mz(l_1 + l_2) = 0\ N \cdot m$$



The max moment will occur at the point where the derivative of the moment is zero. Note that since the moment is the integral of the shear, that point is also the location of zero shear.

$$\mathbf{root}\left(Vzz(x), x, 0\ mm, l_1 + l_2\right) = 2.942\ m$$