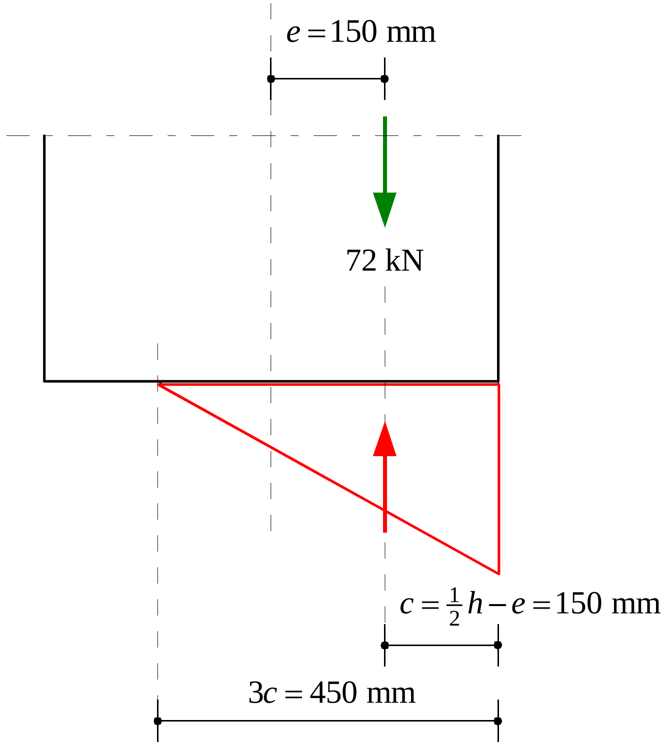
Remarks: See §4.10.2, pages 215 till 219

Answer:

a. $\sigma_{\max} = -0,50 \text{ N/mm}^2$

b. $\sigma_{\max} = -0,53 \text{ N/mm}^2$

Explanation:



$A = 360 \times 10^3 \text{ mm}^2$ and $W = 36 \times 10^6 \text{ mm}^3$

a. $N = 72$ kN

$M = (36 \text{ kN}) \times (0,3 \text{ m}) = 10,8 \text{ kNm}$ ( )

Maximum compressive stress in the right edge:

$$\sigma_{\max} = -\frac{72 \times 10^3 \text{ N}}{360 \times 10^3 \text{ mm}^2} - \frac{10,8 \times 10^6 \text{ Nmm}}{36 \times 10^6 \text{ mm}^3} = -0,50 \text{ N/mm}^2$$

b. $e = \dfrac{M_z}{N} = 150$ mm

The resultant compressive force from the stress distribution under the block is at this spot. The shape of the stress distribution is triangular with $\sigma_{\max}$ at the right side. The length over which the stress distribution acts: $3c = 450$ mm .

$$\tfrac{1}{2}(450 \text{ mm})(600 \text{ mm})\sigma_{\max} = -72 \times 10^3 \text{ N} \Rightarrow \sigma_{\max} = -0,53 \text{ N/mm}^2$$