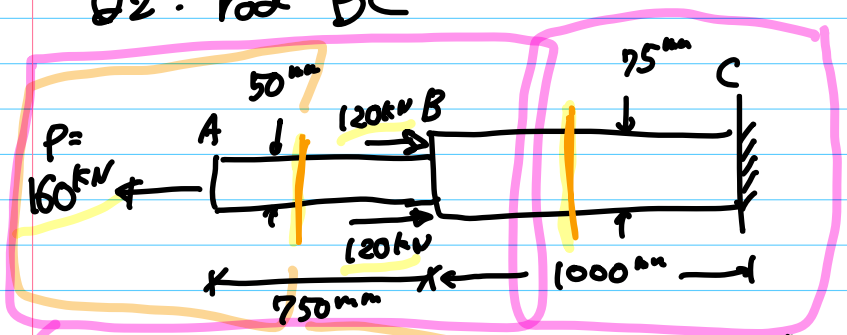
Mini Quiz 4

Knowing that $P = 160\,kN$, determine the average normal stress at the midsection of

Q1 : rod AB

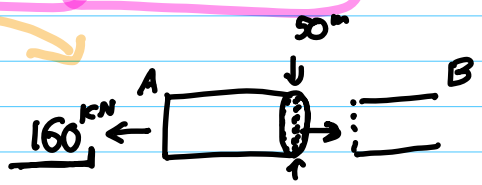
Q2 : rod BC

$$\sigma = \frac{P}{A}$$



Q1: rod AB

$$\sigma = \frac{P}{A}$$

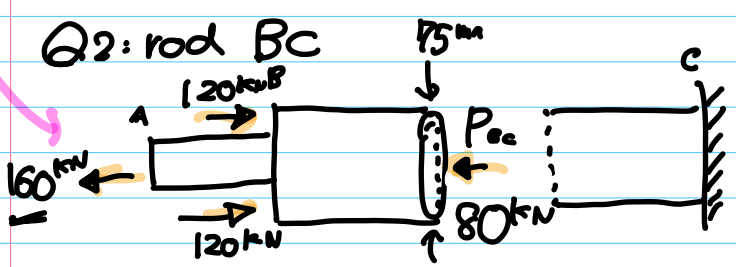


$$\text{Area AB} = 1963.4\,mm^2$$

$$\sigma = \frac{160\,kN}{1963.4\,mm^2} = \frac{160 \cdot 1000\,N}{1963.4\,mm^2} = 81.5\,MPa \text{ (Tension)}$$

Q2: rod BC

$$\sigma = \frac{P}{A}$$



$$P_{BC} = -160\,kN + 120\,kN + 120\,kN = 0$$

$$= -80\,kN$$

$$\text{Area BC} = 4417.9\,mm^2$$

$$\sigma = \frac{-80\,kN}{4417.9\,mm^2} = \frac{80000\,N}{4417.9\,mm^2} = -18.1\,MPa = 18.1\,MPa \text{ (compression)}$$