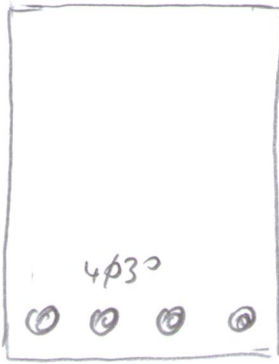


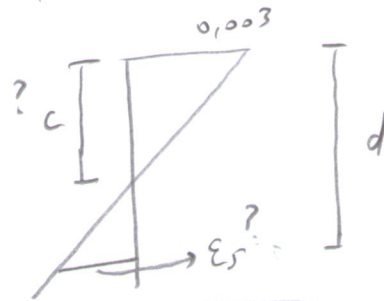
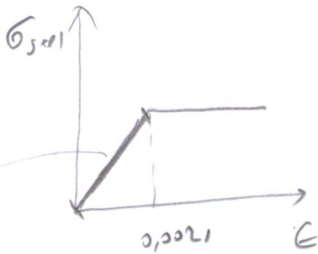
(C)



$$A_{\text{steel}} = 4 \times \left(\frac{\pi 30^2}{4} \right) = 2827,43$$

This area is bigger than the corresponding area for E_s ,
 $2077,18 \text{ cm}^2$ (calculated in part a), which means steel DID NOT
 YIELD

E_s is
 somewhere
 in this
 interval



$$\frac{0,003}{c} = \frac{\epsilon_s}{d-c} \quad \text{--- (1)}$$

Force equilibrium

$$F_T = F_C$$

$$2827,43 \times 200000 \times \epsilon_s = 0,85 \times c \times 0,85 \times \frac{20}{1,5} \times 300$$

$$195669,9 \epsilon_s = c \quad \text{--- (2)}$$

Put (2) in (1)

$$\frac{0,003}{195669,9 \epsilon_s} = \frac{\epsilon_s}{460 - 195669,9 \epsilon_s}$$

$$\Rightarrow \begin{matrix} \epsilon_{s1} = 0,00155 \\ \epsilon_{s2} = -0,00049 \end{matrix} \quad c = 303,2$$

THIS time failure is
 compression failure

$$M_R = 2827,43 \times 200000 \times 0,00155 \times \left(460 - \frac{303,2 \times 0,85}{2} \right) = 290,2 \text{ kN.m}$$

3)