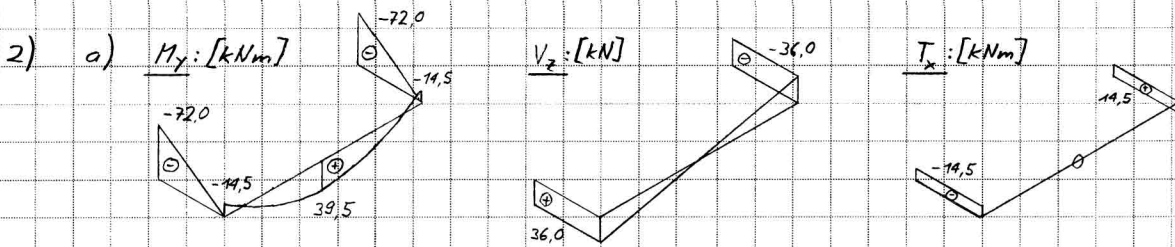
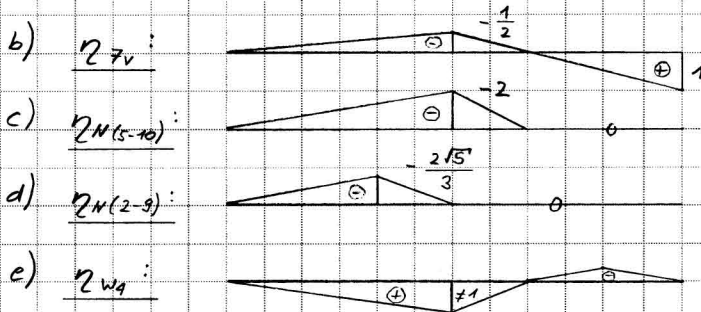
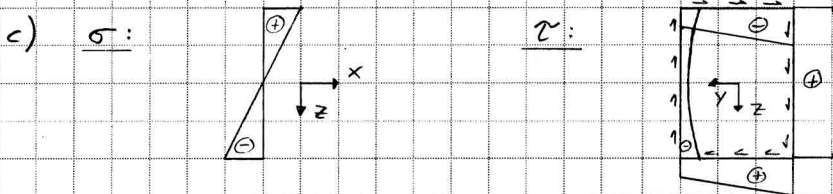


1) a) $N_i = 3qL$; $M_i = \frac{qL^2}{8}$; $V_i = 0$

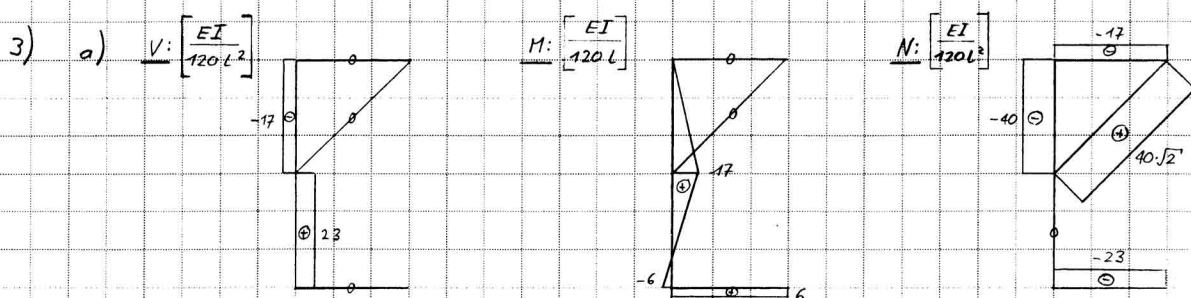
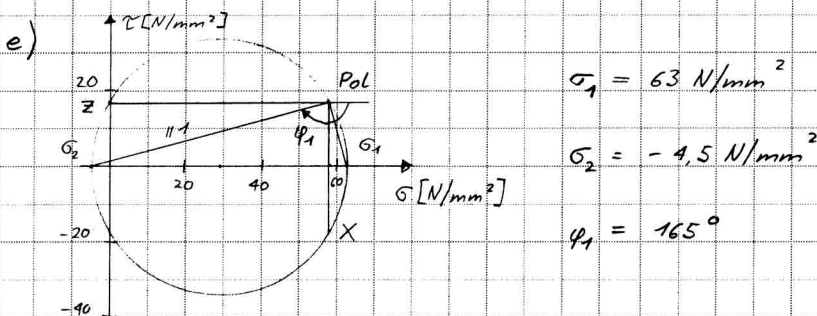


b) $\varphi_{y,z} = -0,478^\circ$



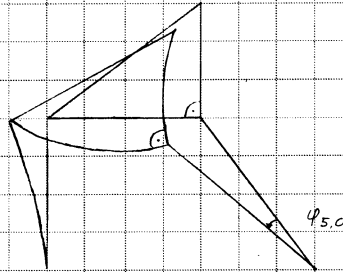
d) Punkt A: $\sigma_x = 186 \text{ N/mm}^2$ $\tau_{yx} = -27,3 \text{ N/mm}^2$

Punkt B: $\sigma_x = 58,7 \text{ N/mm}^2$ $\tau_{zx} = -16,8 \text{ N/mm}^2$



b) $w_{45} = \frac{31L}{360}$

4) a) Verformungsfigur qualitativ:



b) V: $0,0410 \frac{EI}{L^2}$

M: $0,0656 \frac{EI}{L}$

N: $0,0326 \frac{EI}{L^2}$

5) Nach Verformungsmethode II. Ordnung mit Vereinfachung:

$T_{cr} = T_0 + \Delta T_L + \Delta T_z = 20 + 40 + 83,9 = 144 \text{ } ^\circ\text{C}$

Nach Vianello mit Parabelansatz:

$T_{cr} = T_0 + \Delta T_L + \Delta T_z = 20 + 40 + 67,1 = 127 \text{ } ^\circ\text{C}$

6) a) Verschiebem.:

$-\frac{2M_u}{L} \leq H \leq \frac{2M_u}{L}$

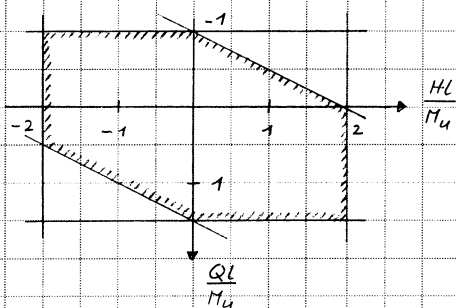
Normalkraft-Balkenm.:

$-\frac{M_u}{L} \leq Q \leq \frac{3M_u}{2L}$

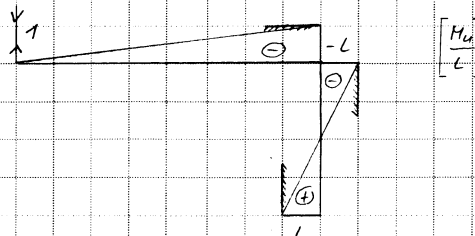
kombinierter Mech.:

$-\frac{2M_u}{L} \leq 2Q - H \leq \frac{3M_u}{L}$

Fließfigur:



b) $Q = \frac{3M_u}{2L}$; $H = \frac{2M_u}{L}$



Plastizitätskontrolle i. O.