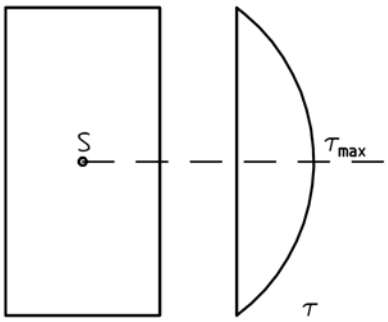
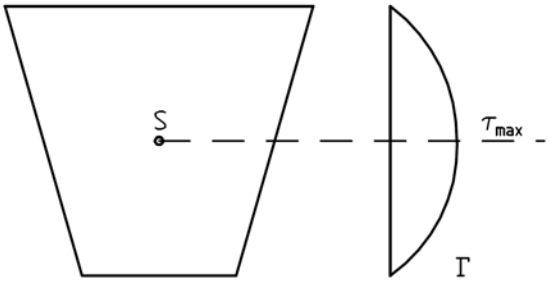
Aufgabe 1

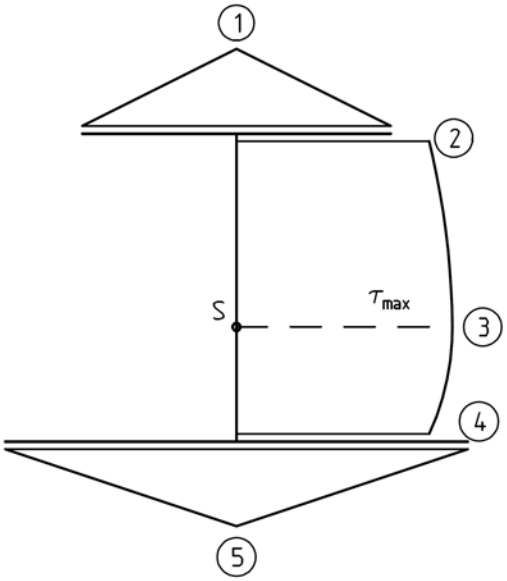
a) $I_{yy} = 24.603{,}75\ cm^4$
$S_{max} = 1366{,}875\ cm^3$
$\tau_{max} = 0{,}185\ kN/cm^2$



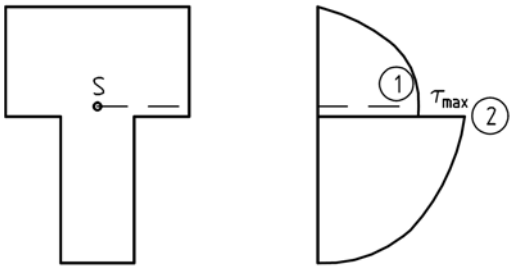
b) $z_S = 14\ cm$
$I_{yy} = 55.500\ cm^4$
$b(z_S) = 25{,}33\ cm$
$S_{max} = 2.787{,}45\ cm^3$
$\tau_{max} = 0{,}09913\ kN/cm^2$



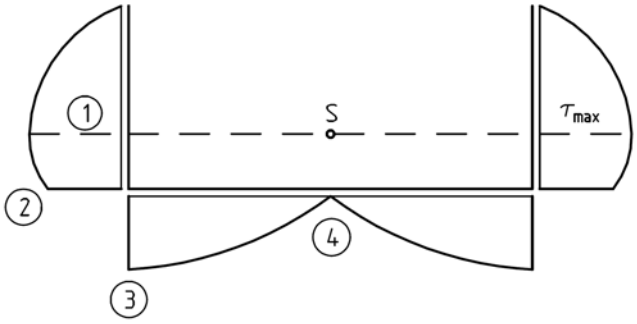
c) $z_S = 18{,}72\ cm$
$I_{yy} = 26.877{,}5\ cm^4$
$S_1 = 354{,}4\ cm^3$
$S_2 = 708{,}8\ cm^3$
$S_3 = 1022{,}8\ cm^3$
$S_4 = 883{,}5\ cm^3$
$S_5 = 441{,}8\ cm^3$
$\tau_1 = 0{,}33\ kN/cm^2$
$\tau_2 = 0{,}66\ kN/cm^2$
$\tau_3 = 0{,}95\ kN/cm^2$
$\tau_4 = 0{,}82\ kN/cm^2$
$\tau_5 = 0{,}27\ kN/cm^2$



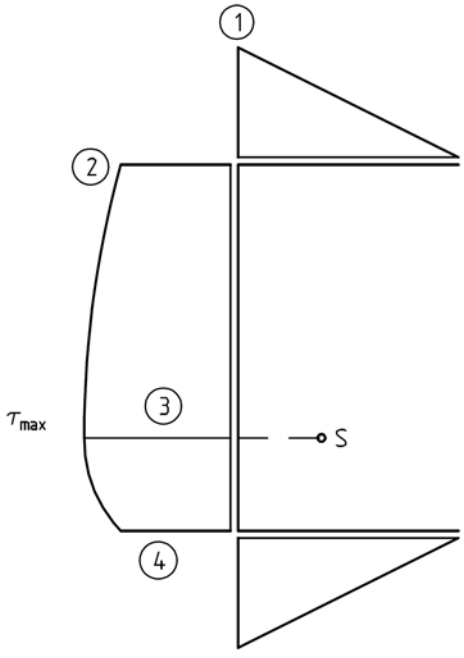
d) $z_S = 13{,}59$ cm
$I_{yy} = 53.643{,}6$ cm^4
$S_1 = 2.308{,}6$ cm³
$S_{Übergang} = 2.283{,}8$ cm³
$\tau_1 = 0{,}086$ kN/cm²
$\tau_{2,\,oben} = 0{,}085$ kN/cm²
$\tau_{2,\,unten} = 0{,}213$ kN/cm²



e) $z_S = 14{,}88$ cm
$I_{yy} = 6.068{,}1$ cm^4
$S_1 = 221{,}4$ cm³
$S_2 = 208{,}3$ cm³
$S_3 = S_2$
$S_4 = 0$
$\tau_1 = 0{,}91$ kN/cm²
$\tau_2 = 0{,}86$ kN/cm²
$\tau_3 = 0{,}57$ kN/cm²
$\tau_4 = 0$

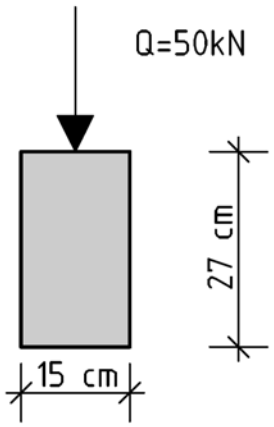


f) $z_S = 27{,}13$ cm
$I_{yy} = 105.870{,}1$ cm^4
$S_1 = 1489{,}4$ cm³
$S_2 = S1$ cm³
$S_3 = 2513{,}6$ cm³
$S_4 = 1827{,}1$ cm³
$\tau_1 = 0{,}35$ kN/cm²
$\tau_2 = 0{,}23$ kN/cm²
$\tau_3 = 0{,}40$ kN/cm²
$\tau_4 = 0{,}29$ kN/cm²

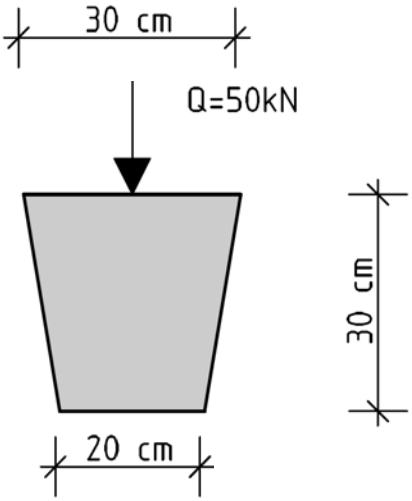


1) Ermitteln Sie für die gegebenen Querschnitte die Schubspannungen infolge Q an den charakteristischen Stellen und stellen Sie die Schubspannungsverteilung über den Querschnitt dar!

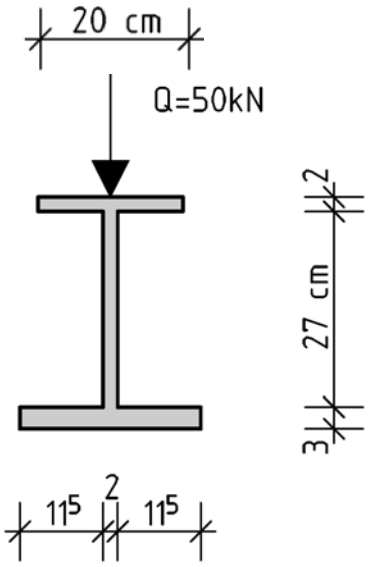
a)



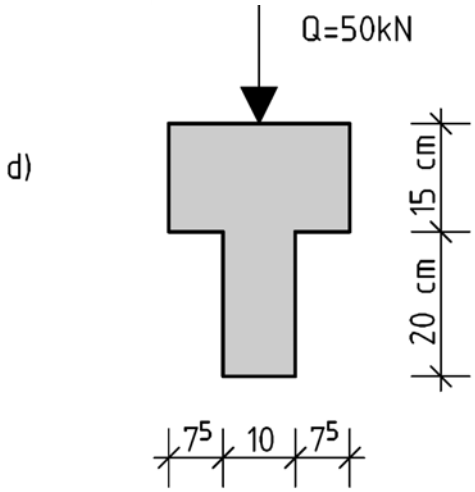
b)



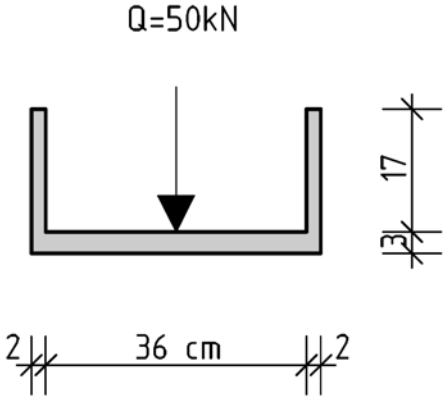
c)



d)



e)



f)