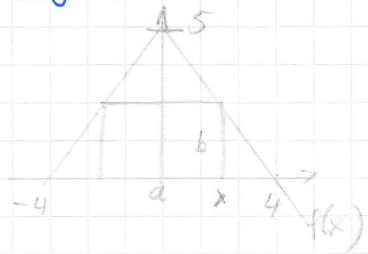
Aufgaben zu Extremwertproblemen 1

1.)

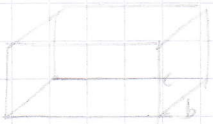


$f(x) = -\frac{5}{4}x + 5$ $\quad A = ab$

$a = 2x \quad b = f(x) \quad A = 2x\left(-\frac{5}{4}x + 5\right)$

Max (2 / 10) $\quad$ Breite: 4m, Höhe: 2,5m

2.)



$4{,}8 = 4a + 4b + 4c \quad 1{,}2 = a + b + c$

a.) $\frac{a}{b} = \frac{2}{3} \quad a = \frac{2}{3}b \quad 1{,}2 = \frac{5}{3}b + c$

$c = 1{,}2 - \frac{5}{3}b$

$V = abc = \frac{2}{3}b^2 \cdot c = \frac{2}{3}b^2\left(1{,}2 - \frac{5}{3}b\right)$

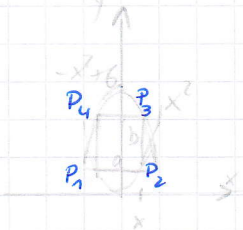
Max (0,48 / 0,06) $\quad b = 0{,}48\,m \quad a = 0{,}32\,m \quad c = 0{,}4\,m$

b.) $a = b \quad 1{,}2 = 2a + c \quad c = 1{,}2 - 2a$

$A_m = 2ac + 2bc = 4ac \quad A_m = 4a(1{,}2 - 2a)$

Max (0,3 / 0,72) $\quad a = b = 0{,}3\,m \quad c = 0{,}6\,m$

3.)



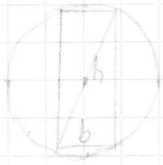
$A = ab \quad a = 2x \quad b = g(x) - f(x)$

$A = 2x(-2x^2 + 6) \quad$ Max (1 / 8)

$a = 2 \quad b = 4$

$P_1(-1/1) \quad P_2(1/1) \quad P_3(1/5) \quad P_4(-1/5)$

4.) $T = b \cdot h^2$



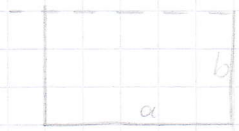
$30 = \sqrt{b^2 + h^2}$

$900 = b^2 + h^2 \quad h^2 = 900 - b^2$

$T = b(900 - b^2) \quad$ Max (17,32 / 10.392,3)

$b = 17{,}32\,cm \quad h = 24{,}5\,cm$

5.)



$A = ab \quad 20m = a + 2b$

$a = 20 - 2b$

$A = (20 - 2b)b$

Max (5 / 50) $\quad b = 5\,m \quad a = 10\,m$