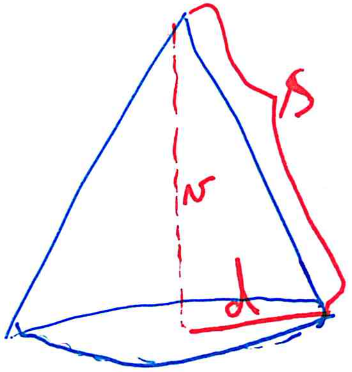
Objem kužeľa   polomer $d=(20{,}4\pm 0{,}1)\,j$ $A=\begin{array}{c c} d & s \\ \end{array}[20{,}4;\ 44{,}6]$

strana $s=(44{,}6\pm 0{,}2)\,j$



$$\underline{V}=\frac{1}{3}v\cdot S_{podstavy}=\frac{1}{3}v\pi d^2=\underline{\frac{1}{3}\pi v d^2}=\underline{\frac{1}{3}\pi\sqrt{s^2-d^2}\cdot d^2}$$

$$V=\frac{1}{3}\pi\sqrt{44{,}6^2-20{,}4^2}\cdot 20{,}4^2\doteq 17284{,}36043\ j^3$$

$$v^2+d^2=s^2$$

$$v=\sqrt{s^2-d^2}$$

$$V=V(s,d)$$

$$dV=\frac{\partial V}{\underline{\partial s}}\cdot h_s+\frac{\partial V}{\partial d}h_d$$

Δs $\qquad$ Δd

ds $\qquad$ $d^2\,dd$

$$\frac{\partial V}{\partial s}=\frac{1}{3}\pi d^2\cdot\frac{1}{\cancel{2}}(s^2-d^2)^{-\frac{1}{2}}\cdot\cancel{2}s=\frac{\pi d^2 s}{3\sqrt{s^2-d^2}}$$

$$\frac{\partial V(A)}{\partial s}=\frac{\pi\, 20{,}4^2\cdot 44{,}6}{3\sqrt{44{,}6^2-20{,}4^2}}=\underline{490{,}072}$$

$$\frac{\partial V}{\partial d}=\frac{1}{3}\pi\left(\frac{1}{\cancel{2}}(s^2-d^2)^{-\frac{1}{2}}(-\cancel{2}d)+\sqrt{s^2-d^2}\,2d\right)=\frac{1}{3}\pi\left(\sqrt{s^2-d^2}\cdot 2d-\frac{d^3}{\sqrt{s^2-d^2}}\right)$$

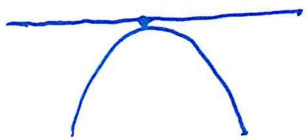
$$\frac{\partial V(A)}{\partial d} = \frac{1}{3}\pi\left(\sqrt{44{,}6^2-20{,}4^2}\cdot 2\cdot 20{,}4 - \frac{20{,}4^3}{\sqrt{44{,}6^2-20{,}4^2}}\right) \doteq 1470{,}384$$

$$dV_A = 490{,}072\cdot h_s + 1470{,}384\, h_d$$

$$dV_{A_{MAX}} = 490{,}072\cdot 0{,}2 + 1470{,}384\cdot 0{,}1 \doteq 245{,}0528 \doteq 250$$

$$\boxed{V = (17\,280 \pm 250)\, j^3}$$

Lokální extrémy



$$g_1(x,y) = y^3 + 12xy + 12x^2$$

$$\left.\begin{aligned} \frac{\partial g_1}{\partial x} &= 12y + 24x = 0 \\ \frac{\partial g_1}{\partial y} &= 3y^2 + 12x = 0 \quad (-2) \end{aligned}\right.$$

$$12y - 6y^2 = 0$$

$$6y(2-y) = 0$$

$$y_1 = 0 \qquad 2 - y = 0$$

$$y_2 = 2$$

$$y_1 = 0 \to x_1 = 0 \to P_1 = [0,0]$$

$$y_2 = 2 \to x_2 = -1 \qquad P_2 = [-1,2]$$

$$\frac{\partial^2 g_1}{\partial x^2} = 24 \qquad \frac{\partial^2 g_1}{\partial y\,\partial x} = \underline{12}$$

$$\frac{\partial^2 g_1}{\partial x\,\partial y} = \underline{12} \qquad \frac{\partial^2 g_1}{\partial y^2} = 6y$$

$$D_1 = \frac{\partial^2 g}{\partial x^2} = 24$$

$$D_2 = \begin{array}{c|cc|} & x & y \\ x & 24 & 12 \\ y & 12 & 6y \end{array} = 144y - 144$$

	D_1	D_2	
$P_1 = [0,0]$	$+24$	-144	NIC
$P_2 = [-1,2]$	$+24$	$+144$	lok. minimum

$$g_2(x,y) = 2x^3 + 9xy^2 + 15x^2 + 27y^2$$

$$\frac{\partial g_2}{\partial x} = 6x^2 + 9y^2 + 30x = 0$$

$$\frac{\partial g_2}{\partial y} = 18xy + 54y = 0$$

$$\downarrow$$

$$9y(2x+6) = 0$$

$y = 0$ — a)

$2x + 6 = 0$

$x = -3$ — b)

a) pro $y = 0$

$$6x^2 + 30x = 0$$

$$6x(x+5) = 0$$

$x = 0$, $x = -5$

$$P_1 = [0,0],\ P_2 = [-5,0]$$

b) pro $x = -3$

$$54 + 9y^2 - 90 = 0$$

$$9y^2 - 36 = 0 \quad /:9$$

$$y^2 - 4 = 0$$

$$y^2 = 4$$

$$y_1 = 2$$

$$y_2 = -2$$

$$P_3 = [-3, 2]$$

$$P_4 = [-3, -2]$$

$$\frac{\partial^2 g_2}{\partial x^2} = 12x + 30$$

$$\frac{\partial^2 g_2}{\partial y \partial x} = 18y$$

$$\frac{\partial^2 g_2}{\partial y^2} = 18x + 54$$

	D_1	D_2	
$P_1 = [0,0]$	+	+	lok. minimum
$P_2 = [-5,0]$	−	+	lok. maximum
$P_3 = [-3,2]$	−	−	NK
$P_4 = [-3,-2]$	−	−	NK

$$D_1 = 12x + 30$$

$$D_2 = \begin{vmatrix} 12x+30 & 18y \\ 18y & 18x+54 \end{vmatrix} = (12x+30)(18x+54) - (18y)^2$$

$$-\qquad\qquad 0$$