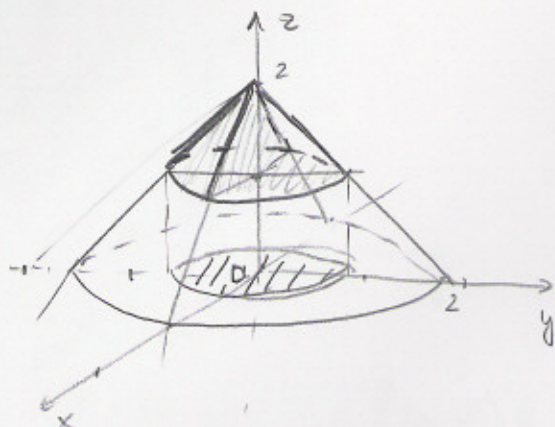


IZRAČUNAJTE MASO PLOSKVE

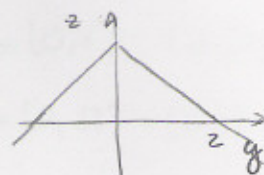
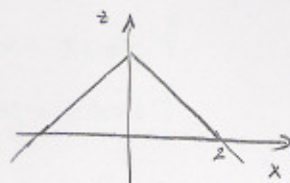
$$P = \{(x, y, z) \in \mathbb{R}^3 \mid z = 2 - \sqrt{x^2 + y^2}, \ 1 \leq z \leq 2\}$$

ČE JE GOSTOTA SORAZMERNJA ODDALJENOSTI OD RAVNINE  $z=0$ !



$$x=0 \Rightarrow z = 2 - |y|$$

$$y=0 \Rightarrow z = 2 - |x|$$



$$S(P) = \iint_P \rho \, dS = \iint_D k |2 - \sqrt{x^2 + y^2}| \sqrt{1 + p^2 + q^2} \, dx \, dy$$

$$\rho(x, y, z) = k |z|$$

$$z=1: \quad 1 = 2 - \sqrt{x^2 + y^2} \Rightarrow \sqrt{x^2 + y^2} = 1$$

$$\Rightarrow D = \{(x, y) \in \mathbb{R}^2 \mid x^2 + y^2 \leq 1\}$$

$$p = z_x = -\frac{2x}{2\sqrt{x^2 + y^2}} = -\frac{x}{\sqrt{x^2 + y^2}}$$

$$q = z_y = -\frac{y}{\sqrt{x^2 + y^2}}$$

$$\left. \begin{array}{l} p = z_x = -\frac{x}{\sqrt{x^2 + y^2}} \\ q = z_y = -\frac{y}{\sqrt{x^2 + y^2}} \end{array} \right\} \begin{aligned} 1 + p^2 + q^2 &= 1 + \frac{x^2}{x^2 + y^2} + \frac{y^2}{x^2 + y^2} \\ &= \frac{x^2 + y^2 + x^2 + y^2}{x^2 + y^2} = \frac{2(x^2 + y^2)}{x^2 + y^2} = 2 \end{aligned}$$

UVEDIHO POLARNE KOORDINATE

$$x = r \cos \varphi$$

$$y = r \sin \varphi$$

$$r = r$$

$$= k \int_0^{2\pi} d\varphi \int_0^1 (2 - r) \sqrt{2} r \, dx \, dy = k \sqrt{2} \cdot 2\pi \int_0^1 (2r - r^2) dr$$

$$= k \sqrt{2} \cdot 2\pi \left[ r^2 - \frac{r^3}{3} \right]_0^1 = k \sqrt{2} \cdot 2\pi \left[ 1 - \frac{1}{3} \right] = \frac{2k\sqrt{2}\pi}{3} = \underline{\underline{\frac{4\sqrt{2}k\pi}{3}}}$$