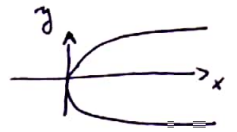


Dátum:

křivka $y = k\sqrt{x} = kx^{1/2}$

$a = 80 \text{ mm}$

$b = 50 \text{ mm}$



Učít: x_T, y_T

$y = k\sqrt{x}$ prohledat i bodem $[a; b]$

$b = k\sqrt{a} \Rightarrow k = \frac{b}{\sqrt{a}} \Rightarrow y = \frac{b}{\sqrt{a}}\sqrt{x}$

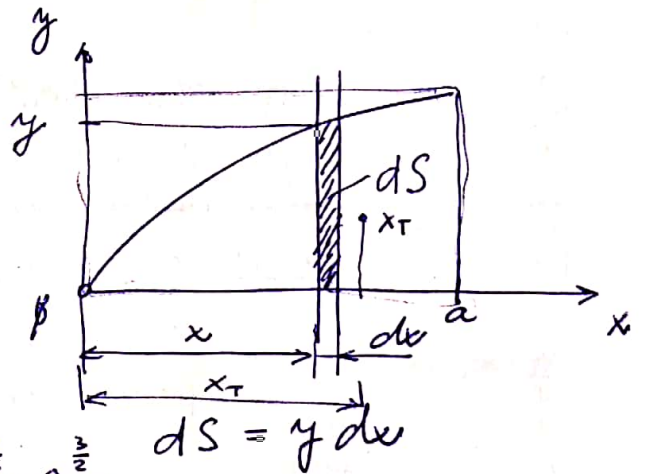
Plocha obrazce:

$$S = \int_{(x)} y dx = \int_{(s)} dS =$$

$$= k \int_0^a \sqrt{x} dx = k \frac{2}{3} [x^{3/2}]_0^a =$$

$$= \frac{2}{3} k a^{3/2} = \frac{2}{3} \frac{b}{\sqrt{a}} a^{3/2} = \frac{2}{3} b a^{1/2} \cdot a^{3/2} =$$

$$= \frac{2}{3} ab$$



x -ová souřadnice těžiště:

středový moment plochy:

$$U_y = \int_{(s)} x dS = k \int_0^a x \sqrt{x} dx =$$

$$= k \int_0^a x^{3/2} dx = k \frac{2}{5} [x^{5/2}]_0^a = k \frac{2}{5} a^{5/2}$$

Rovnovaha statických momentů plochy:

$$S \cdot x_T = \int_{(s)} x dS$$

$$S \cdot x_T = U_y$$

$$x_T = \frac{U_y}{S} =$$

$$\Rightarrow \frac{k \frac{2}{5} a^{5/2}}{\frac{2}{3} k a^{3/2}} = \frac{3}{5} a$$

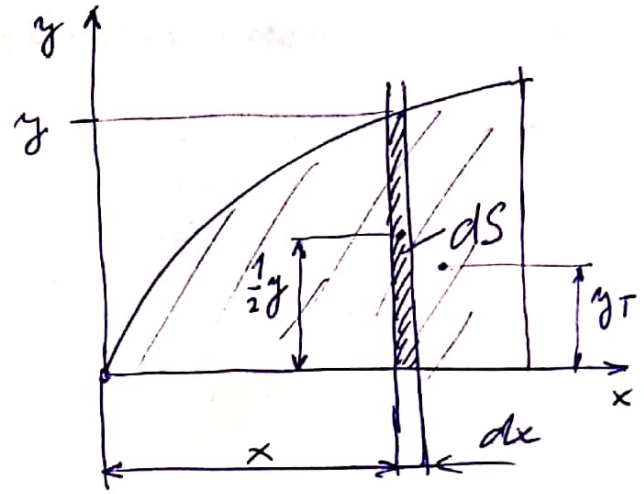
Rovnovaha stat. momentu plochy

$$S \cdot y_T = \int_{(s)} \frac{1}{2} y dS =$$

$$dS = y dx$$

$$= \int_0^a \frac{1}{2} y^2 dx$$

U_x



Stat. dny' moment plochy kolem osy x:

$$U_x = \int_0^a \frac{1}{2} y^2 dx = \frac{1}{2} k^2 \int_0^a x dx = \frac{1}{2} k^2 \frac{1}{2} [x^2]_0^a =$$

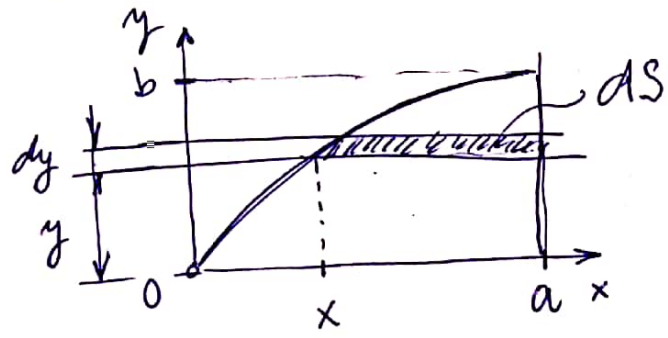
$$= \frac{1}{4} k^2 a^2 = \frac{1}{4} \frac{b^2}{a} a^2 = \frac{1}{4} a b^2$$

$$S \cdot y_T = U_x \Rightarrow y_T = \frac{U_x}{S} = \frac{\frac{1}{4} a b^2}{\frac{2}{3} a b} = \underline{\underline{\frac{3}{8} b}}$$

$$T[x_T, y_T] \quad x_T = \frac{3}{5} a$$

$$y_T = \frac{3}{8} b$$

alternativa:



$$y = k \sqrt{x}$$

$$x = \frac{y^2}{k^2}$$

$dS = (a-x) dy$
Rov. momentu stat. momentu plochy kolem osy x:

$$S \cdot y_T = \int_{(s)} y dS$$

$$U_x = \int_{(s)} y dS = k \int_0^b \sqrt{x} (a-x) dy =$$

$$= k \int_0^b \frac{y}{k} (a - \frac{y^2}{k^2}) dy = \dots$$