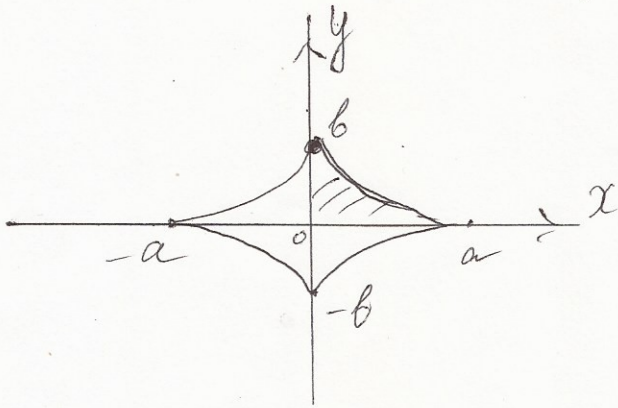


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2) Найми площадь, огибаемую процессом
 в осях x и y $\begin{cases} x = a \cos^3 t, \\ y = b \sin^3 t. \end{cases}$



$$S = \int_{t_1}^{t_2} y(t) \cdot y_t' dt$$

$$x(t) = a \cos^3 t$$

$$dx = (a \cos^3 t)' dt$$

$$dx = -3a \cos^2 t \sin t dt$$

$$\frac{1}{4} S: \begin{matrix} (0; b) & \rightarrow & (a; 0) \\ t_1 & & t_2 \end{matrix}$$

$$t_1: \begin{cases} 0 = a \cos^3 t_1 \\ b = b \sin^3 t_1 \end{cases} \left. \begin{array}{l} \cos t_1 = 0 \\ \Rightarrow \sin t_1 = 1 \end{array} \right\} \Rightarrow t_1 = \frac{\pi}{2}$$

$$t_2: \begin{cases} a = a \cos^3 t_2 \\ 0 = b \sin^3 t_2 \end{cases} \Rightarrow \begin{cases} \cos t_2 = 1 \\ \sin t_2 = 0 \end{cases} \Rightarrow t_2 = 0$$

$$S = 4 \int_0^{\frac{\pi}{2}} b \sin^3 t \cdot (-3a \cos^2 t \sin t) dt =$$

$$= -4 \cdot 3ab \int_{\frac{\pi}{2}}^0 \sin^4 t \cos^2 t dt = \left\{ \int_c^d f(t) dt = - \int_d^c f(t) dt \right\} =$$

$$= 12ab \int_0^{\frac{\pi}{2}} \left(\frac{1 - \cos 2t}{2} \right)^2 \cdot \left(\frac{1 + \cos 2t}{2} \right) dt = \frac{3\pi ab}{8}$$