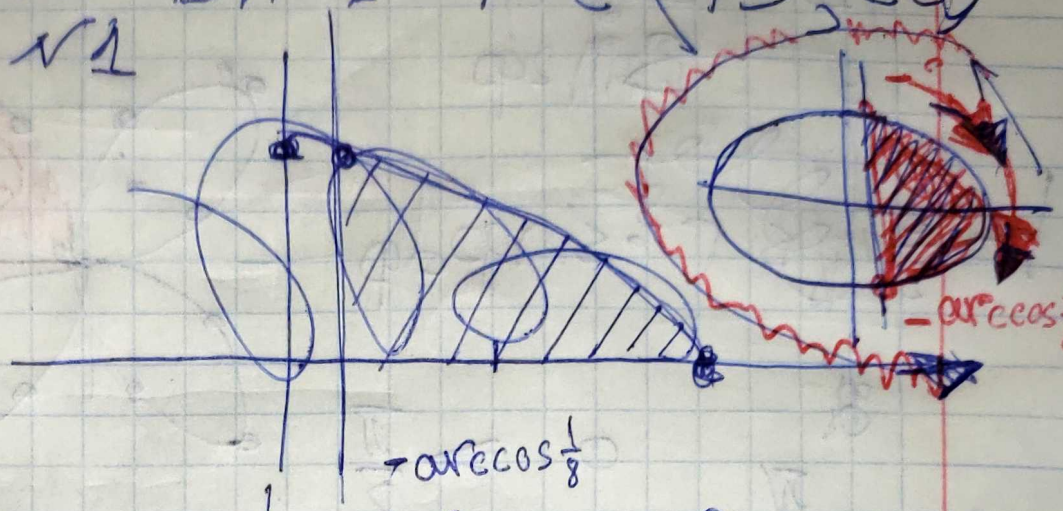
ИиДУ РК1 БИЛЕТ №2 (15, 28)

№1

$$\begin{cases} x = 2\cos t \\ y = \sin t \end{cases}$$

t	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
x	2	$\sqrt{3}$	$\sqrt{2}$	1	0
y	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1



$2\cos t = \frac{1}{4}$

$\cos t = \frac{1}{8}$

$t = \arccos\frac{1}{8}$

$$S = 2\int_{-\arccos\frac{1}{8}}^{\arccos\frac{1}{8}} \sin^2 t\,dt = -\int_{-\arccos\frac{1}{8}}^{\arccos\frac{1}{8}} \frac{1-\cos 2t}{2}\,dt =$$

$$= -\left(\frac{t}{2} - \frac{\sin 2t}{4}\right)\Bigg|_{-\arccos\frac{1}{8}}^{\arccos\frac{1}{8}} =$$

$$= -\arccos\frac{1}{8} + \frac{3\sqrt{7}}{16} + \arccos\frac{1}{8} - \frac{3\sqrt{7}}{16}$$

$$= \int_{\arccos\frac{1}{8}}^{-\arccos\frac{1}{8}} (\cos 2t - 1)\,dt = \left(\frac{\sin 2t}{2} - t\right)\Bigg|_{\arccos\frac{1}{8}}^{-\arccos\frac{1}{8}}$$

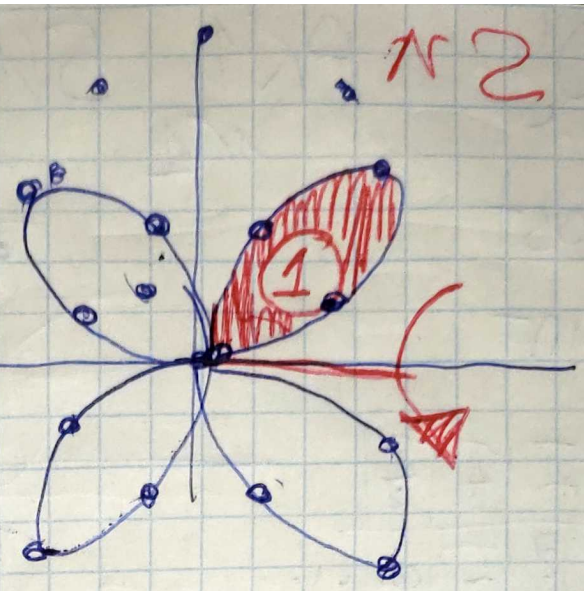
$$= 2\arccos\left(\frac{1}{8}\right) - \frac{3\sqrt{7}}{32}$$

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

$$S = \int_{\arccos\frac{1}{8}}^{-\arccos\frac{1}{8}} 2\sin^2 t\,dt$$

$D = \sin 2\varphi$

$B \quad \sin 2\varphi$



$$V = \frac{2}{3}\pi \int_{\text{B}} r^3 \cdot \sin\varphi \, d\varphi$$

$$\varphi \quad 0 \Rightarrow \frac{\pi}{2}$$

$$V = \frac{2}{3}\pi \int_0^{\pi} 8 \sin^4\varphi \cdot \cos^3\varphi \, d\varphi = \frac{16}{3}\pi \int_0^{\pi/2} \sin^4\varphi \cdot (1-\sin^2\varphi) \, d\sin\varphi$$

$$= \frac{16}{3}\pi \int_0^{\pi/2} (\sin^4\varphi - \sin^6\varphi) \, d\sin\varphi =$$

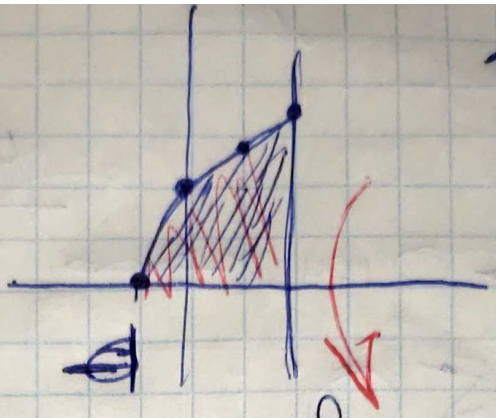
$$= \frac{16}{3}\pi \left(\frac{\sin^5\varphi}{5} - \frac{\sin^7\varphi}{7} \right) \Bigg|_0^{\pi/2} = \frac{16\pi}{3} \cdot \left(\frac{1}{5} - \frac{1}{7} \right)$$

$$= \frac{16\pi}{15} - \frac{16\pi}{21} = \frac{32\pi}{105} +$$

№3

$y = 2\sqrt{x+1}$

$y = 2$



$$S = 2\pi \int_a^b f(x) \cdot \sqrt{1 + (f'(x))^2}\, dx$$

$$S = 2\pi \cdot \int_{-1}^{2} 2\sqrt{x+1} \cdot \sqrt{1 + \left(\frac{1}{\sqrt{x+1}}\right)^2}\, dx =$$

$$= 4\pi \int_{-1}^{2} \frac{\sqrt{x+1} \cdot \sqrt{x+2}}{\sqrt{x+1}}\, dx = 4\pi \int_{-1}^{2} \sqrt{x+2}\, dx = \ldots = +$$

$x+2 = t$

$$= 4\pi \left(\frac{2(x+2)\sqrt{x+2}}{3} \right) \Big|_{-1}^{2} = 4\pi \left(\frac{16}{3} - \frac{2}{3} \right) = \frac{56\pi}{3}$$

№4

$$\int_1^{+\infty} \frac{\sin\frac{1}{x}}{\sqrt{x+1}}$$

$\sin\frac{1}{x} \sim 0$ при $x \to \infty$

$$\frac{\sin\frac{1}{x}}{\sqrt{x+1}} \lesssim 0$$

+

I рев

не опр.

не сход

№5

$$\int_0^1 \frac{\ln(1+\sqrt[5]{x^3})}{e^x-1}$$

II рев

$\ln(1+\sqrt[5]{x^3}) \sim x^{\frac{3}{5}}$

$e^x - 1 \sim x$

$$\frac{\ln(1+\sqrt[5]{x^3})}{e^x-1} \lesssim \frac{x^{3/5}}{x} < \frac{1}{x^{4/5}}$$

$q = \frac{4}{5}$ $q < 1$

+

сход.