

28 marca.

Df ~ 5.

$$1. \int_{\mathbb{R}} x e^{-\sqrt{x^2+1}} d\mu_F = \int_{(-\infty; -1)} + \int_{\{-1\}} + \int_{\{1\}} + \int_{(1; +\infty)} x + \int_{(-1; 1)} = \beta \int_{-\infty}^{-1} x e^{-\sqrt{x^2+1}} dx - e^{-\sqrt{2}} + e^{-\sqrt{2}} + 3 \int_1^{\infty} x e^{-\sqrt{x^2+1}} = 6 \int_1^{\infty} x e^{-\sqrt{x^2+1}} dx \quad (1)$$

$$u = \sqrt{x^2+1}$$

$$\textcircled{2} 6 \int_1^{\infty} \frac{x \sqrt{x^2+1}}{x} e^{-u} du = 6 \int_1^{\infty} u e^{-u} du =$$

$$= -u e^{-u} \Big|_{\sqrt{2}}^{\infty} + \int_{\sqrt{2}}^{\infty} e^{-u} du = \sqrt{2} e^{-\sqrt{2}} + (-e^{-u}) \Big|_{\sqrt{2}}^{\infty} =$$

$$= \sqrt{2} e^{-\sqrt{2}} + e^{-\sqrt{2}} = (1+\sqrt{2}) e^{-\sqrt{2}}$$

$+ \infty = 0$ , m.k. kerēm

$$= \int_{-\infty}^{+\infty} x e^{-\sqrt{x^2+1}} dx + (-5 e^{-\sqrt{2}}) + 4 e^{-\sqrt{2}} =$$

$$= -e^{-\sqrt{2}}$$

$$2. \int_{[0,4]} (x^2 \cdot \chi_{[0,2]}(x) - x d(x)) d\lambda =$$

$$= \int_{[0,2]} x^2 d\lambda - \int_{[0,4]} x d(x) d\lambda = \frac{x^3}{3} \Big|_0^2 -$$

$$- \int_{\substack{x \in \mathbb{Q} \\ x \in [0,4]}} x d\lambda = \frac{8}{3} - \underbrace{0}_{\substack{\text{m.k. } \mathbb{Q} \text{ o } \text{remko} \\ 0}} = \frac{8}{3}$$

$$3. I = \int_{[0,1]} \sum_{n=1}^{\infty} \chi_{[0, \frac{1}{n}]}(x) d\lambda$$

$$f = \sum_{n=1}^{\infty} \chi_{[0, \frac{1}{n}]} \sim \text{промаз}$$

гел

$$\begin{aligned} & \int_{[0,1]} \sum_{n=1}^{\infty} \chi_{[0, \frac{1}{n}]}(x) d\lambda = \sum_{n=1}^{\infty} \int_{[0,1]} \chi_{[0, \frac{1}{n}]}(x) d\lambda = \\ & = \sum_{n=1}^{\infty} \lambda\left(\left[\frac{1}{n}, 1\right]\right) = \sum_{n=1}^{\infty} \frac{1}{n} \end{aligned}$$

Тка  $n \rightarrow \infty$  ред рач.  $\Rightarrow$

$$\Rightarrow \int I = +\infty$$



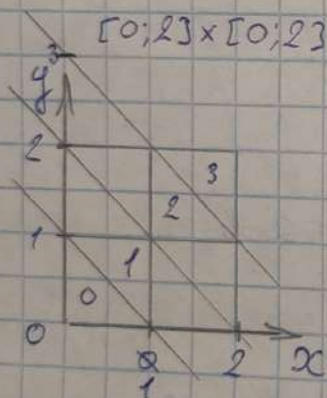
$$I = \int_{[0;1]} \sum_{n=1}^{\infty} n^{-\frac{1}{2}} \chi_{[0; \frac{1}{n^2}]}(x) d\lambda$$

трансорно

$$\sum_{n=1}^N \int_{[0;1]} n^{-\frac{1}{2}} \chi_{[0; \frac{1}{n^2}]}(x) d\lambda =$$

$$= \sum_{n=1}^N n^{-\frac{1}{2}} \cdot \frac{1}{n^2} \xrightarrow{N \rightarrow \infty} C, \text{ где } C < +\infty$$

$$4. \int_{[0;2] \times [0;2]} [x+y] d\lambda_2 = 1 \cdot \frac{3}{2} + 2 \cdot \frac{3}{2} + 3 \cdot \frac{1}{2} =$$



$$= 6$$