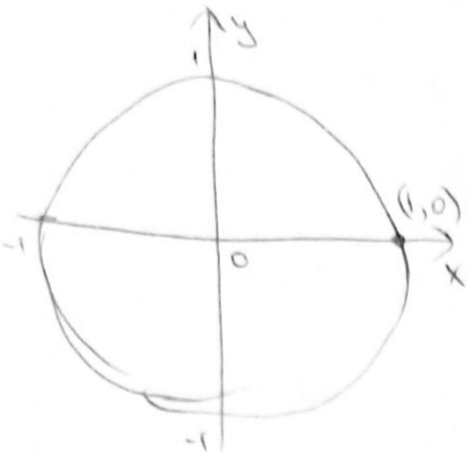
N 1.2.



$$(x, y) \longrightarrow (r, \varphi)$$

$$\begin{cases} r = 1 \\ \varphi_i = [0, 2\pi] \\ i = 1,2 \\ \varphi_0 = 0 \end{cases}$$

← длина искомой дуги

$$L = r \cdot \left(2\pi - \max\{\varphi_2 - \varphi_1, \varphi_1 - \varphi_2\}\right)$$

$$\mathbb{E}(L) = 2\pi - \mathbb{E}\left(\max\{\varphi_2 - \varphi_1, \varphi_1 - \varphi_2\}\right)$$

$$p_{\varphi_2} = \frac{1}{2\pi}, \ \varphi_2 \in [0, 2\pi)$$

$$p_{\varphi_3} = \frac{1}{2\pi}, \ \varphi_3 \in [0, 2\pi)$$

$$\Rightarrow p_{\varphi_{\cancel{3}} - \varphi_2} = \int_0^{2\pi} \frac{d\varphi}{4\pi^2} = \frac{1}{2\pi}, \ \varphi_3 - \varphi_2 \in [0, 2\pi) \quad (\mathrm{I})$$

$$p_{\varphi_2 - \varphi_1} = \frac{1}{2\pi}, \ \varphi_2 - \varphi_1 \in [0, 2\pi) \quad (\mathrm{II})$$

$$\mathbb{E}(L) = 2\pi - \mathbb{E}\left(\max\{\varphi_2 - \varphi_1, \varphi_1 - \varphi_2\}\right)$$

т.к. (I) = (II), то ищем $0 \leq \varphi_1 \leq \varphi_2 < 2\pi$

$$\mathbb{E}(L) = 2\pi - \int_0^{2\pi} \frac{\varphi_2 - \varphi_1}{2\pi} \, d[\varphi_2 - \varphi_1] = 2\pi - \left.\frac{(\varphi_2 - \varphi_1)^2}{2 \cdot 2\pi}\right|_0^{2\pi} = \underline{\pi}$$