

**Zadatak 15.** Dokaži da je funkcija  $f(x) = \sqrt{\log_3 \cos \frac{2\pi x}{\sqrt{2}}}$  periodička. Odredi neki njezin period.

**Rješenje.**  $f(x) = \sqrt{\log_3 \cos \frac{2\pi x}{\sqrt{2}}}$

$$\log_3 \cos \frac{2\pi x}{\sqrt{2}} \geq 0 \implies \cos \frac{2\pi x}{\sqrt{2}} \geq 1 \implies \cos \frac{2\pi x}{\sqrt{2}} = 1$$

$$\frac{2\pi x}{\sqrt{2}} = 2k\pi, k \in \mathbf{Z} \implies x = k\sqrt{2}, k \in \mathbf{Z} \implies D_f = \{k\sqrt{2}, k \in \mathbf{Z}\}$$

$$\begin{aligned} f(x + \sqrt{2}) &= \sqrt{\log_3 \cos \frac{2\pi}{\sqrt{2}}(x + \sqrt{2})} = \sqrt{\log_3 \cos \left(\frac{2\pi x}{\sqrt{2}} + 2\pi\right)} \\ &= \sqrt{\log_3 \cos \frac{2\pi x}{\sqrt{2}}} = f(x) = P = \sqrt{2}. \end{aligned}$$