

**Zadatak 36.** Koliko rješenja ima jednačina  $(f \circ g)(x) = |1-x|$  ako je  $f(x) = 2^{-x}$ ,  $g(x) = \log_{0,5}(|x| - a)$ ,  $a \in \mathbf{R}$ ?

**Rješenje.**  $f(x) = 2^{-x}$ ,  $g(x) = \log_{0,5}(|x| - a)$ ,  $a \in \mathbf{R}$

$$(f \circ g) = 2^{-\log_{0,5}(|x|-a)} = 2^{\log_2(|x|-a)} = |x| - a, a < |x|$$

$$|x| - a = |1 - x| \implies |x| - |1 - x| = a$$

(i)  $x < 0 \implies -x - 1 + x = a \implies a = -1$

(ii)  $0 < x < 1 \implies x - 1 + x = a \implies 2x = a + 1 \implies x = \frac{a+1}{2}$

(iii)  $x > 1 \implies x + 1 - x = a \implies a = 1$

Dakle,

$$a = -1 \implies x \in \langle -\infty, 0 \rangle$$

$$a = 1 \implies x \in [1, +\infty)$$

$$|a| < 1 \implies x = \frac{a+1}{2}$$

$$|a| > 1 \implies \text{nema rješenja.}$$