

**Zadatak 30.** Riješi nejednadžbu  $(f \circ g)(x) < 1$ , pri čemu je  $f(x) = 2^{1-x}$ ,  $g(x) = \log_{\frac{1}{2}} \left| \frac{x+2}{x-1} \right|$ .

**Rješenje.**  $f(x) = 2^{1-x}$ ,  $g(x) = \log_{\frac{1}{2}} \left| \frac{x+2}{x-1} \right| = \log_2 \left| \frac{x-1}{x+2} \right|$ ,  $x \neq -2, 1$

$$(f \circ g)(x) = 2^{1 - \log_2 \left| \frac{x-1}{x+2} \right|} = 2^{\log_2 2 \left| \frac{x+2}{x-1} \right|} = 2 \left| \frac{x-1}{x+2} \right|$$

$$2 \left| \frac{x+2}{x-1} \right| < 1 \implies \left| \frac{x+2}{x-1} \right| < \frac{1}{2}$$

(i)  $x \in \langle -2, 1 \rangle$

$$\frac{x+2}{1-x} < \frac{1}{2}$$

$$\frac{x+2}{1-x} - \frac{1}{2} < 0$$

$$\frac{2x+4-1+x}{2(1-x)} < 0 \quad / \cdot 2$$

$$\frac{3(x+1)}{1-x} < 0 \quad / : 3$$

$$\implies x \in \langle -2, -1 \rangle$$

(ii)  $x \notin [-2, 1]$

$$\frac{x+2}{x-1} < \frac{1}{2}$$

$$\frac{x+2}{x-1} - \frac{1}{2} < 0$$

$$\frac{2x+4-x+1}{2(x-1)} < 0 \quad / \cdot 2$$

$$\frac{x+5}{x-1} < 0$$

$$\implies x \in \langle -5, -2 \rangle$$

$$\implies x \in \langle -5, -1 \rangle \setminus \{-2\}.$$