Zadatak 32.   Riješi nejednadžbu $(f \circ g)(x) < 2$ ako je
$f(x) = \log_x \frac{1}{3} - \log_{\sqrt{3}} x$, $g(x) = 3^{1-|x|}$.

Rješenje. $f(x) = \log_x \dfrac{1}{3} - \log_{\sqrt{3}} x$, $g(x) = 3^{1-|x|}$, $x > 0$

$$(f \circ g)(x) = \log_{3^{1-|x|}} \frac{1}{3} - \log_{\sqrt{3}} 3^{1-|x|} = -\log_{3^{1-|x|}} 3 - 2\log_3 3^{1-|x|}$$

$$= -\frac{1}{\log_3 3^{1-|x|}} - 2(1 - |x|) = -\frac{1}{1 - |x|} - 2(1 - |x|)$$

$$= \frac{1}{|x| - 1} + 2(|x| - 1)$$

$$\frac{1}{|x| - 1} + 2(|x| - 1) < 2 \implies \frac{1 + 2(|x| - 1)^2 - 2(|x| - 1)}{|x| - 1} < 0$$

$$\implies \frac{2(|x|^2 - 2|x| + 1 - |x| + 2) + 1}{|x| - 1} < 0 \implies \frac{\overbrace{2|x|^2 - 6|x| + 7}^{>0 \; \forall x \in \mathbf{R}}}{|x| - 1} < 0$$

$$\implies |x| - 1 < 0 \implies |x| < 1$$

$$\implies x \in (0, 1).$$