Zadatak 27. Za dane funkcije $f(x) = \log_{0.2}|x^2 - x|$ i $g(x) = 5^x$ riješi nejednadžbu $(g \circ f)(x) \leqslant \frac{1}{2}$.

Rješenje. $f(x) = \log_{0.2}|x^2 - x|$, $g(x) = 5^x$

$$(g \circ f)(x) = 5^{-\log 5|x^2-x|} = \frac{1}{|x^2 - x|}, x \neq 0, 1$$

$$\frac{1}{|x^2 - x|} \leqslant \frac{1}{2} \implies |x^2 - x| \geqslant 2$$

(i) $x \in \langle 0, 1\rangle$

$-x^2 + x \geqslant 2 \implies x^2 - x + 2 \leqslant 0 \implies x \notin \mathbf{R}$

(ii) $x \notin [0, 1]$

$x^2 - x \geqslant 2 \implies x^2 - x - 2 \geqslant 0 \implies (x - 2)(x + 1) \geqslant 0$

$\implies x \in \langle -\infty, -1] \cap [2, +\infty\rangle$.