(2)

FÁBIÁN TÍMEA NIKOLETT

RDDZXA

(2) $f(x) = \frac{2}{|x+1|}$ $x \in \mathbb{R} \setminus \{-1\} \Rightarrow D_f = \mathbb{R} \setminus \{1\}$

$g(x) = x^2 - 2x - 4$ $x \in [0, +\infty) \Rightarrow D_g = [0, +\infty)$

a) $\frac{2}{|x+1|} = \frac{2}{|y+1|}$ pl. $\begin{matrix} x=2 \\ y=-4 \end{matrix}$ $\frac{2}{|3|} = \frac{2}{|-3|}$

$\Rightarrow$ nem invertálható $f(x)=f(y)$, de $x \neq y$

b) $D_{f \circ g} = \{x \in D_g : g(x) \in D_f\}$

$= \{x \in [0, +\infty) : x^2 - 2x - 4 \in \mathbb{R} \setminus \{-1\}\}$

$= \{x \in [0, +\infty) : x^2 - 2x - 4 \neq -1\}$

$x^2 - 2x - 4 \neq -1$

$x^2 - 2x - 3 \neq 0$

$x_{1,2} \neq \frac{2 \pm \sqrt{4+4 \cdot 3}}{2} = \frac{2 \pm 4}{2} \begin{matrix} 3 \\ -1 \end{matrix}$

$\hookrightarrow x \in \mathbb{R} \setminus \{-1, 3\}$

$D_{f \circ g} = [0, +\infty) \setminus \{3\}$

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$$(f \circ g)(x) = f(g(x)) = \frac{2}{|x^2-2x-4+1|} = \frac{2}{|x^2-2x-3|}$$

LI A $\begin{cases} x \in [0,3) \to \frac{2}{-x^2+2x+3} \\ x \in (3,+\infty) \to \frac{2}{x^2-2x-3} \end{cases}$

c) $g^{-1}[[-4,4]] = \{x \in [0,+\infty) : x^2-2x-4 \in [-4,4]\}$

$= \{x \in [0,+\infty) : -4 \le x^2-2x-4 \le 4\}$

$-4 \le x^2-2x-4 \le 4$

$0 \le x^2-2x \le 8$

$0 \le x^2-2x$

↳ csak akkor működik, ha $x+1$

$-1 \le x^2-2x$

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$$x^2 - 2x \leq 8$$

$$x^2 - 2x - 8 \leq 0$$

$$x_{1,2} = \frac{2 \pm \sqrt{4 + 4 \cdot 8}}{2} = \frac{2 \pm 6}{2} \begin{cases} 4 \\ -2 \end{cases}$$

$$-2 \leq x \leq 4$$

$$g^{-1}[-4,4] = \{ x \in [0, +\infty) : x \in [-2, 4] \} = [0, 4]$$