



Zadatak 19. Odredi kompozicije $f \circ f = f^2$, $f \circ f \circ f = f^3$, $f \circ f \circ \dots \circ f = f^n$ za sljedeće funkcije:

1) $f(x) = x - 1$;

2) $f(x) = 1 - x$;

3) $f(x) = x^2$;

4) $f(x) = \frac{1}{x}$, $x \neq 0$.

Rješenje.

1) $(f \circ f)(x) = x - 2$, $(f \circ f \circ f)(x) = x - 3$, $(f \circ f \circ f \circ f)(x) = x - 4$;
 $f^n(x) = x - n$;

2) $f^2(x) = x$, $f^3(x) = 1 - x$, $f^4(x) = x$

$$f^n(x) = \begin{cases} x, & n = 2k, \\ f(x), & n = 2k - 1, k \in \mathbf{N}; \end{cases}$$

3) $f^2 = x^4$, $f^3 = x^6$, $f^4 = x^8$;

$$f^n(x) = x_{2n};$$

4) $f^2 = x$, $f^3 = \frac{1}{x}$, $f^4 = x$;

$$f^n(x) = \begin{cases} x, & n = 2k, \\ f(x) = \frac{1}{x}, & n = 2k - 1, k \in \mathbf{N}. \end{cases}$$