

Zadatak 3. Za zadane funkcije odredi njima inverzne funkcije i nacrtaj im grafove:

1) $f(x) = 3x + 5$;

2) $f(x) = \sqrt{x+1}$;

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

4) $f(x) = \frac{x+1}{x-1}$.

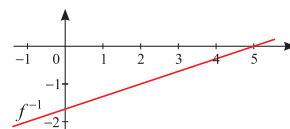
Rješenje.

1) $f(x) = 3x + 5$

$$x = 3y + 5$$

$$3y = x - 5$$

$$f^{-1}(x) = \frac{1}{3}x - \frac{5}{3}$$

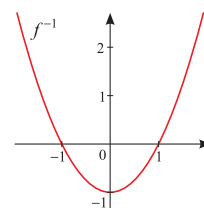


2) $f(x) = \sqrt{x+1}$

$$x = \sqrt{y+1}$$

$$x^2 = y + 1$$

$$f^{-1}(x) = x^2 - 1$$



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

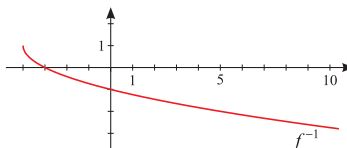
$$x^2 - 2x - 3 = (x - 3)(x + 1)$$

$$x = y^2 - 2y - 3$$

$$y^2 - 2y - 3 - x = 0$$

$$y = \frac{2 - \sqrt{4 + 4 \cdot (x + 3)}}{2} = \frac{2 - 2\sqrt{1 + x + 3}}{2}$$

$$\Rightarrow f^{-1}(x) = 1 - \sqrt{4 + x}$$



4) $f(x) = \frac{x+1}{x-1}$

$$x = \frac{y+1}{y-1} \Rightarrow xy - x = y + 1$$

$$(x - 1)y = x + 1$$

$$\Rightarrow f^{-1}(x) = \frac{x+1}{x-1}, x \neq 1$$

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

