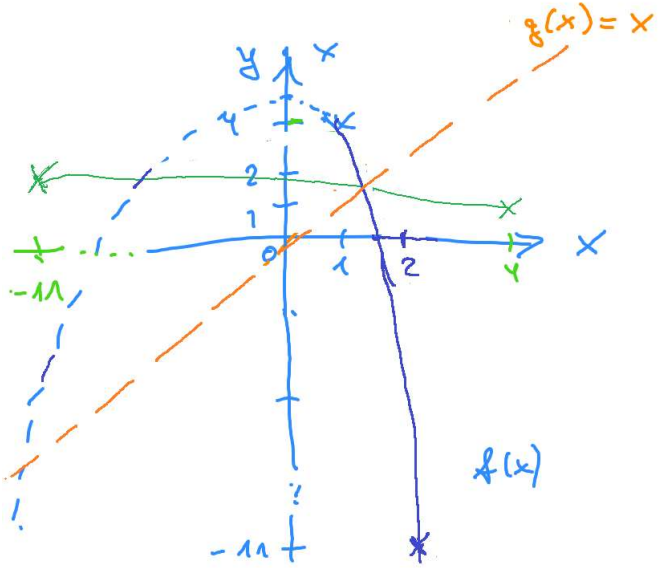
Example (inverse function)

Let $f: [1,2] \to \cancel{\mathbb{R}}\ [-11,4]$ ← target area has to fit for f^{-1}!

$$x \mapsto f(x) := -x^4 + 5 .$$

Determine the inverse function f^{-1} of f and the domain of f^{-1}.



f^{-1} exists as mapping from $[-11,4] \to [1,2]$

$$y \mapsto f^{-1}(y) = \sqrt[4]{5-y}$$

$y = -x^4 + 5$ or

$f(f^{-1}(y)) = y$

$\Leftrightarrow \quad -(f^{-1}(y))^4 + 5 = y \qquad |-5$

$\Leftrightarrow \quad -(f^{-1}(y))^4 = y - 5 \qquad |\cdot(-1)$

$\Leftrightarrow \quad (f^{-1}(y))^4 = 5 - y \qquad |\cdot(\ )^{1/4}$

$\Leftrightarrow \quad f^{-1}(y) = \pm\sqrt[4]{5-y}$

$\Leftrightarrow \quad x > 0$