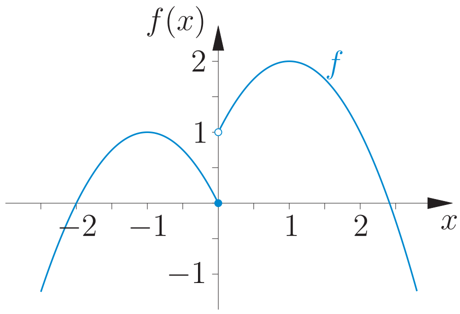
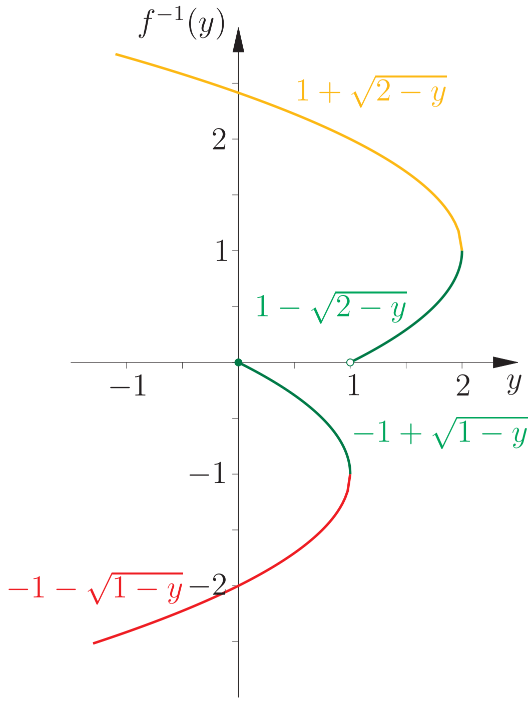


The function $f : \mathbb{R} \to \mathbb{R}$ defined by:

$$f(x) = \begin{cases} -x\,(x+2), & x \le 0 \\ 1 + 2x - x^2, & x > 0 \end{cases}$$



By formally computing expressions for the inverse and checking the conditions for an inverse functions, we find:

- The function $f|_{(-\infty,-1]}$ has the inverse $g_1 : (-\infty, 1] \to (-\infty, -1]$ with

$$g_1(y) = -1 - \sqrt{1-y}, \qquad y \in (-\infty, 1]\,.$$

- The function $f|_{[-1,1]}$ has the inverse $g_2 : [0, 2] \to [-1, 1]$ with

$$g_2(y) = \begin{cases} -1 + \sqrt{1-y}, & y \in [0,1] \\ 1 - \sqrt{2-y}, & y \in (1,2] \end{cases}$$

- The function $f|_{[1,\infty)}$ has the inverse $g_3 : (-\infty, 2] \to [1, \infty)$ with

$$g_3(y) = 1 + \sqrt{2-y}, \qquad y \in (-\infty, 2]\,.$$