

$$12a - 20 < a^2 - \varepsilon \rightarrow 0 < a^2 - 12a + 20 + \varepsilon \xrightarrow{+12a-20} a^2 - a - 12a + 20 + \varepsilon$$

$$= \varepsilon (a-2)(a+2a+5) - 12(a-2)$$

$$= \varepsilon (a-2)(a^2+2a-12)$$

$$(a+5)(a-2)$$

مستقیم

۱,۷۵

$$f(x) = cx + k \rightarrow f(x) = 12 + k \rightarrow k = -10 \quad f(x) = c_n - 10$$

$$D_{f^{-1}} = R_{f(x)} \quad R_{f^{-1}} = D_{f(x)}$$

۵

$$1) f(x) = 11$$

$$\Rightarrow f(f(x)) = f(c_n - 10) = c(c_n - 10) - 10 = 9n - 20$$

$$f(x) = \frac{ax}{n-1} \rightarrow n = \frac{ax}{y-1} \rightarrow f(x)^{-1} = \frac{a}{n-a} \rightarrow a = \frac{2a}{a} - a = 0$$

۵

$$1) f \circ f^{-1} = f(f^{-1}(x)) = \emptyset \quad 2) f \circ g^{-1} = \{(2,2), (2,4)\}$$

$$3) f^{-1} \circ f = f^{-1}(f(x)) = \emptyset \quad 4) g^{-1} \circ f = \{(2,2), (2,4), (4,2)\}$$

$\{(2,2), (2,4), (4,2)\}$

$\{(2,2), (2,4), (4,2)\}$

۱

$$h = \{(1,2), (2,2), (2,4), (4,2)\}$$

$$h = \{(1,2), (2,2), (2,4), (4,2)\}$$

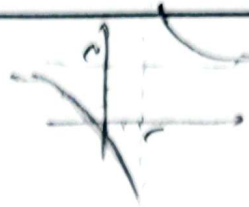
$$h = \{(1,2), (2,2), (2,4), (4,2)\}$$

$$h = \{(1,2), (2,2), (2,4), (4,2)\}$$

۵

Übungen

$$y = \frac{cx+1}{x+c}$$



✓ Lösung

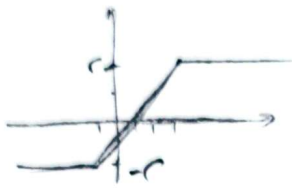
$$y = \frac{cx+1}{x+c} \rightarrow x = \frac{cy+1}{y-c} \rightarrow f^{-1}(y) = \frac{cy+1}{y-c}$$



8

$$f(x) = -1 - |x-c|$$

$$[a,b] = [-1,c]$$



$$f^{-1}(x) = \frac{x+f}{r} \quad -\infty < x < \infty$$

①

9

$$f(x) = \begin{cases} x+c & x \geq 1 \\ \varepsilon x-1 & x \leq 0 \end{cases}$$



✓ Lösung

$$D f(x) = \mathbb{R} \quad f^{-1}(x) = ?$$

$$f^{-1}(x) = \begin{cases} y+c = x \rightarrow y = x-c & x \geq 1 \\ \varepsilon y-1 = x \rightarrow y = \frac{x+1}{\varepsilon} & x \leq -1 \end{cases}$$

$$\begin{cases} x \geq 1 \\ x \leq -1 \end{cases}$$

$$\begin{cases} 1 \leq \frac{x}{\varepsilon} - c = x-c & x \geq 1 \\ \frac{x+1}{\varepsilon} \leq -1 & x \leq -1 \end{cases}$$

①

10

$$f(x) = x^c = \frac{(x+1)^c}{x+c}$$

$$f^{-1}(x) = \frac{ax+b}{cx+d}$$

$$f^{-1}(b) = ?$$

$$x^c = \frac{(x+1)^c}{x+c} \rightarrow x^c(x+c) = (x+1)^c$$

$$= \frac{x^c + cx^{c+1} - x^c - c}{x+c} = \frac{-1-cx}{x+c}$$

$$\begin{cases} a = -1 \\ b = -c \\ d = c \end{cases}$$

①

9

$$f^{-1}(y) = \frac{-1-cx}{x+c} \rightarrow x = \frac{-cy-1}{y+c} \rightarrow f^{-1}(y) = \frac{-cy-1}{y+c} \quad c=1 \rightarrow f^{-1}(b) = \frac{-1-c}{-c} = 1$$

$$f(x) = \frac{x}{x+1} \rightarrow y = \frac{x}{x+1} \rightarrow y(x+1) = x \rightarrow yx + y = x \rightarrow yx - x = -y \rightarrow x(y-1) = -y \rightarrow x = \frac{y}{1-y}$$

$$\Delta = 1-4y^2 \rightarrow x = 1 \pm \sqrt{1-4y^2}$$

$$-\frac{1}{2} \leq y \leq \frac{1}{2}$$

①

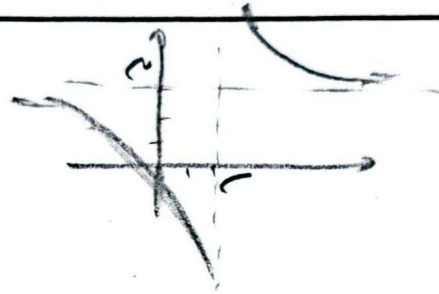
10

$$f^{-1}(y) = 1 \pm \sqrt{1-4y^2}$$

$$-\frac{1}{2} \leq y \leq \frac{1}{2} \quad a \neq 0$$

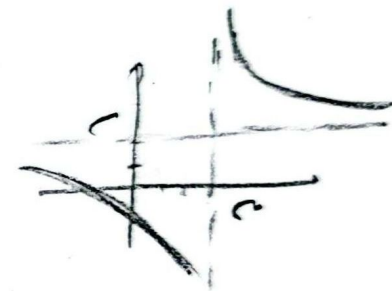
Übungen

$$y = \frac{cx+1}{x-r}$$



✓ Lösung

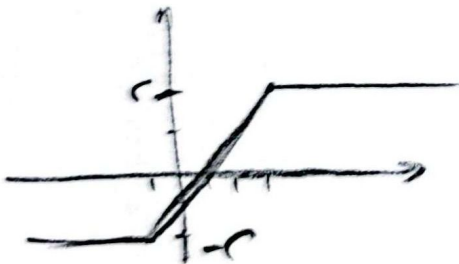
$$y = \frac{cx+1}{x-r} \rightarrow x = \frac{y-r}{c} \rightarrow \text{fens}^{-1} = \frac{y-r}{c}$$



6

$$f(x) = |x-1| - |x-c|$$

$$[a, b] = [-1, c]$$



7

$$f(x) = |x-1| - |x-c|$$

at