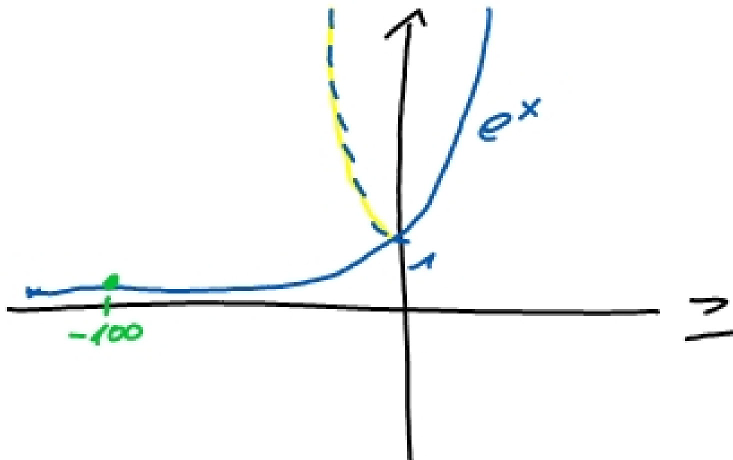
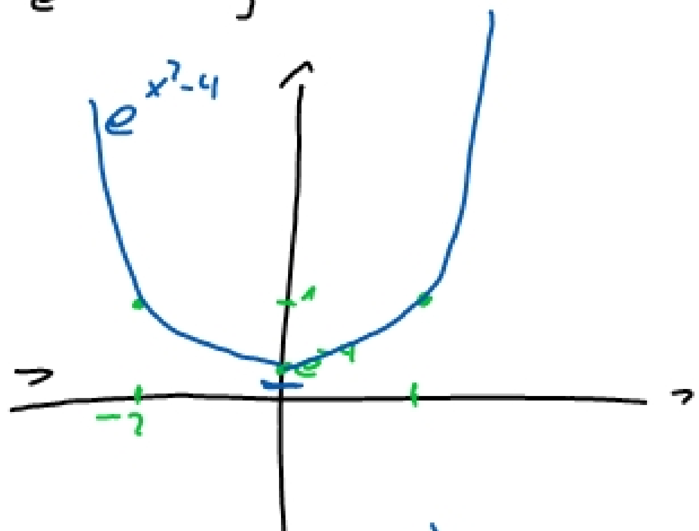
Hallo jetzt g

1) $\# = \{(x,y) \in \mathbb{R} \times \mathbb{R} \mid y = e^{x^2-4}\}$





$\left(g(x) = x^2 - 4 \quad \rightarrow \quad \mathbb{D} = \mathbb{R} \quad \Rightarrow \mathbb{W} = \mathbb{R}^{\geq -4} \right)$

a) Eigenschaften: Funktion da rechtseindeutig

nicht injektiv, da $f(3) = f(-3)$

total, da $\mathbb{D} = \mathbb{R}$

nicht surjektiv, da $y \geq e^{-4}$

b) $\# = \{(x,y) \in \mathbb{R}_0^+ \times \mathbb{R}^{\geq e^{-4}} \mid y = e^{x^2-4}\}$

c) $f(x) = e^{x^2-4}$, $\mathbb{D} = \mathbb{R}$; $\mathbb{W} = \mathbb{R}^{\geq e^{-4}}$

d) $y = e^{x^2-4}$ $\quad | \ln$

$\ln y = x^2 - 4$ $\quad | +4$

$\ln y + 4 = x^2$ $\quad | \sqrt{\ }$

$\pm\sqrt{\ln y + 4} = x$

$a^x = b \iff x = \log_a b$

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

$f(x) = x^3 \cdot e^{x^2-4}$

$\mathbb{D}^* = \mathbb{R}_0^+$, $\mathbb{W} = \mathbb{R}^{\geq e^{-4}}$

$f(-x) = (-x)^3 \cdot e^{(-x)^2-4}$

$= -x^3 \cdot e^{x^2-4}$

$-f(-x) = x^3 \cdot e^{x^2-4}$

$\mathbb{W}_{f^{-1}} = \mathbb{R}_0^+$

$\mathbb{D}_{f^{-1}} = \mathbb{R}^{\geq e^{-4}}$

$f^{-1}(e^{-4}) = \sqrt{\ln e^{-4} + 4}$

$\sqrt{-4+4}$

$\sqrt{0} = 0$

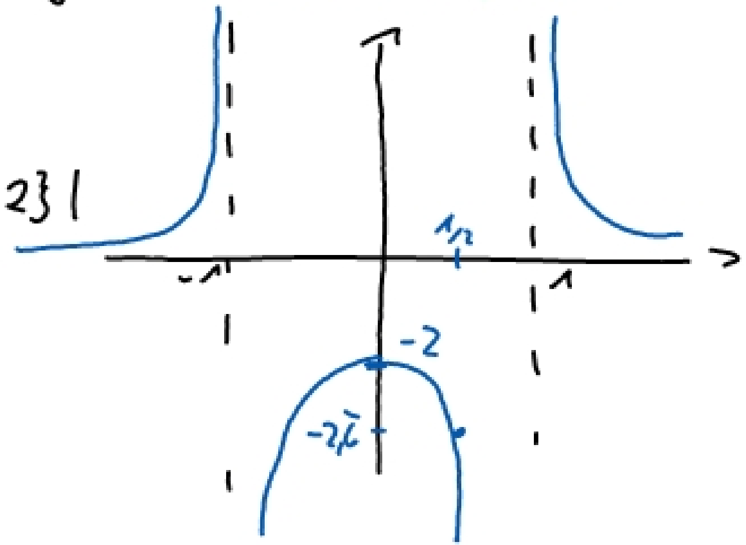
e) $f(x) = f(-x)$

$f(-x) = e^{(-x)^2-4} = e^{x^2-4} = f(x)$

✓

$\heartsuit = \{(x,y) \in \mathbb{R} \times \mathbb{R} \mid y = \frac{2}{x^2-1}\}$

(HYPERBEL)



$\heartsuit = \{(x,y) \in \mathbb{R}_0^+ \setminus \{1\} \times \{y \in \mathbb{R} \mid y > 0 \vee y \leq -2\} \mid$

$y = 2/x^2-1\}$

$\mathbb{R}_0^+ \setminus \{1\} \times \mathbb{R} \setminus]-2;0]$

Achsensymmetrie : $f(x) = f(-x)$

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

$y = \frac{2}{x^2-1} \quad | \cdot (x^2-1) \cdot 1/y$

$x^2-1 = 2/y \quad |+1$

$x^2 = \frac{2}{y}+1 \quad |\sqrt{\ }$

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