

1.1 Sym: $f(-x) = -2x + 2x e^{1-(-x)^2} = -(2x - 2x e^{1-x^2}) = -f(x)$

Also: $f(-x) = -f(x) \Rightarrow$ P. Sym. zum Ursprung

NST: $f(x) = 2x(1 - e^{1-x^2})$ (\leftarrow Faktorisieren!); $x_1 = 0$

$$1 - e^{1-x^2} = 0 \Leftrightarrow e^{1-x^2} = 1 \quad | \ln; \ln(1) = 0$$

$$1 - x^2 = 0 \Leftrightarrow x^2 = 1 \Rightarrow \underline{x_2 = -1}; \underline{x_3 = 1} \quad (\text{Sym!})$$

1.2 Für $x \rightarrow \infty$: $2x e^{1-x^2} \rightarrow " \infty \cdot 0 "$: Bruch für L.H. herstellen!

$$f(x) = \frac{2x}{e^{1-x^2}} = \frac{2x \rightarrow \infty}{e^{x^2-1} \rightarrow \infty} \xrightarrow{\text{L.H.}} \frac{2}{2x \cdot e^{x^2-1} \rightarrow \infty \cdot \infty} \rightarrow \underline{0}$$

$y = 2x$ ist eine schräge Asymptote

1.3 $f(x) = 2x(1 - e^{1-x^2})$; P-Regel; $(1 - e^{1-x^2})' = 2x e^{1-x^2}$

$$f'(x) = 2x(2x e^{1-x^2}) + 2(1 - e^{1-x^2}) = 2 - 2e^{1-x^2} + 4x^2 e^{1-x^2}$$

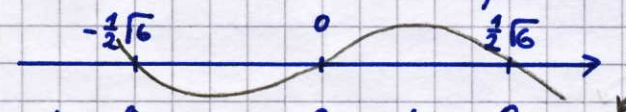
$$f''(x) = 0 + 2 \cdot 2x e^{1-x^2} + 8x e^{1-x^2} + 4x^2 \cdot (-2x) e^{1-x^2} \quad \text{P-Regel!}$$

$$= (4x + 8x - 8x^3) e^{1-x^2} = \underline{4x(3 - 2x^2) e^{1-x^2}}$$

1.4 $f''(x) = 4x(3 - 2x^2) e^{1-x^2} = 0 \Rightarrow 4x(3 - 2x^2) = 0$; $x_1 = 0$

$$3 - 2x^2 = 0 \Leftrightarrow x^2 = \frac{3}{2} \Rightarrow x_2 = -\sqrt{\frac{3}{2}} = -\frac{1}{2}\sqrt{6}; \quad x_3 = \frac{1}{2}\sqrt{6}$$

Alle NST sind 1-f m. vzw; $f''(x) = (-8x^3 + 12x) e^{1-x^2}$



vZ f''(x) + 0 - 0 + 0 - ; Intervalle nicht
Gf rekr W₁ likr W₂ rekr. W₃ likr explizit verlangt

$$f(0) = 0 \Rightarrow \underline{W_2(0|0)}$$

$$f\left(\sqrt{\frac{3}{2}}\right) = 2 \cdot \sqrt{\frac{3}{2}} - 2 \cdot \sqrt{\frac{3}{2}} \cdot e^{1-\sqrt{\frac{3}{2}}^2} = \sqrt{6} - \sqrt{6} \cdot e^{-1/2} = \sqrt{6} \left(1 - \frac{1}{\sqrt{e}}\right)$$

$$\underline{W_3\left(\frac{1}{2}\sqrt{6} \mid \sqrt{6} \left(1 - \frac{1}{\sqrt{e}}\right)\right)} \approx W_3(1,22 \mid 0,96); \quad \underline{W_2(\approx -1,22 \mid \approx -0,96)}$$

(wegen Sym.!)