

Kurvendiskussion

$$f(x) = (x - 1) \cdot e^x$$

1. Ableitungen

$$f'(x) = (x - 1) \cdot e^x + e^x$$

$$f'(x) = x \cdot e^x$$

$$f''(x) = x \cdot e^x + e^x$$

$$f''(x) = (x + 1) \cdot e^x$$

$$f'''(x) = (x + 1) \cdot e^x + e^x$$

$$f'''(x) = (x + 2) \cdot e^x$$

2. Nullstellen

$$f(x) = (x - 1) \cdot e^x = 0$$

$$(x - 1) \cdot e^x = 0$$

$$x - 1 = 0$$

$$x = 1$$

$$N(1|0)$$

3. Extrema

$$f'(x) = x \cdot e^x = 0$$

$$x \cdot e^x = 0$$

$$x = 0$$

$$f''(0) = (0 + 1) \cdot e^0 > 0 \Rightarrow \text{TP}$$

$$f(0) = (0 - 1) \cdot e^0 = -1$$

$$TP(0|-1)$$

4. Wendestellen

$$f''(x) = (x + 1) \cdot e^x = 0$$

$$(x + 1) \cdot e^x = 0$$

$$(x + 1) = 0$$

$$x = -1$$

$$f'''(-1) = (-1 + 2) \cdot e^{-1} = 0.368 \neq 0 \Rightarrow \text{WP}$$

$$f(-1) = (-1 - 1) \cdot e^{-1} = -0.736$$

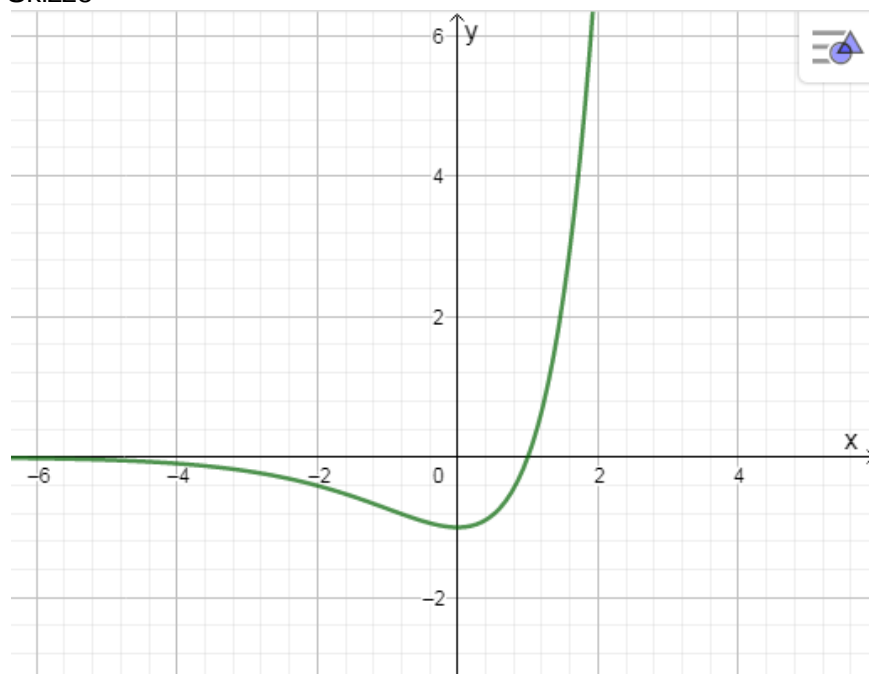
$$W(-1|-0.736)$$

5. Verhalten für $x \rightarrow \pm\infty$

$$\lim_{x \rightarrow +\infty} \underbrace{(x - 1)}_{+\infty} \cdot \underbrace{e^x}_{+\infty} = +\infty$$

$$\lim_{x \rightarrow -\infty} \underbrace{(x - 1)}_{-\infty} \cdot \underbrace{e^x}_0 = -\infty$$

6. Skizze



$$f(x) = (x - 1) e^x$$

