$f(x) = x^2 e^x$

1) $\mathbb{D} = \{x \mid x \in \mathbb{R}\}$; $P_y(0|0)$; Symmetrie: Keine

2) Nst: $0 = x^2 e^x$

$x_{0_1} = 0$ $\quad \neq 0$

3) Unstetigkeiten: Keine

4) lok. Extrema: $f'(x) = e^x(2x + x^2)$

n.B: $0 = e^x(2x + x^2)$

$\neq 0$ $\quad x_{E_1} = 0$; $x_{E_2} = -2$

$f''(x) = e^x(x^2 + 4x + 2)$

h.B: $f''(0) = 2 > 0 \curvearrowright P_T(0|0)$

$f''(-2) = e^{-2}(4 - 8 + 2) = -\frac{2}{e^2} < 0 \curvearrowright$

$P_H(-2|0{,}54)$

5) WP: $f''(x) = e^x(x^2 + 4x + 2)$

n.B: $0 = e^x(x^2 + 4x + 2)$

$\neq 0$ $\quad x_{W_1} \approx -0{,}58$; $x_{W_2} \approx -3{,}41$

$f'''(x) = e^x(x^2 + 6x + 6)$

h.B: $f'''(-0{,}58) \approx 1{,}6 \curvearrowright > 0 \curvearrowright$ Rechts $\curvearrowright P_{W_1}(-0{,}58|0{,}18)$

$f'''(-3{,}41) \approx -0{,}09 < 0 \curvearrowright$ Li. Rechts $\curvearrowright P_{W_2}(-3{,}41|0{,}38)$

6) $x \to \pm\infty$: $\lim\limits_{x \to \pm\infty} x^2 e^x = +\infty \cdot \begin{pmatrix} +\infty \\ 0 \end{pmatrix} = \begin{pmatrix} +\infty \\ 0 \end{pmatrix}$

$\curvearrowright$ Asymptote: $y = 0$

7)