

Nr. 9) a) $f(x) = x \cdot e^x$

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

waagrechte Tangente $\Rightarrow f'(x) = 0$

$$\underbrace{e^x}_{\neq 0} \cdot (1+x) = 0 \Rightarrow \underline{\underline{x_{\text{waag.}} = -1}} \Rightarrow \underline{\underline{P(-1 | -\frac{1}{e})}}$$

b) $f(x) = x^2 \cdot e^{2x}$

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

waagr. Tangente $\Rightarrow f'(x) = 0$

$$f'(x) = e^{2x} \cdot (2x + 2x^2) = \underbrace{e^{2x}}_{\neq 0} \cdot 2x \cdot (1+x) = 0$$

$$\Rightarrow \underline{\underline{x_1 = 0}} \vee \underline{\underline{x_2 = -1}}$$

$$f(0) = 0 \cdot e^0 = 0 \Rightarrow \underline{\underline{P_1(0 | 0)}}$$

$$f(-1) = (-1)^2 \cdot e^{-2} = +\frac{1}{e^2} \Rightarrow \underline{\underline{P_2(-1 | \frac{1}{e^2})}}$$

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

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

$$f'(x) = e^{-x} (1 - x + 2) = \underbrace{e^{-x}}_{\neq 0} \cdot (3-x) = 0$$

$$\underline{\underline{x_1 = 3}}$$

$$f(3) = (3-2) \cdot e^{-3} = 1 \cdot e^{-3} = \frac{1}{e^3}$$

$$\Rightarrow \underline{\underline{P(3 | \frac{1}{e^3})}}$$