Nr. 8) a) $f_t(x) = x^2 + 2tx + 2$; $f_t'(x) = 2x + 2t$; $f_t''(x) = 2$

Extrema notw. Bed. $2x + 2t = 0 \Rightarrow \underline{\underline{x_1 = -t}}$

hinr. Bed. $f_t''(-t) = 2 < 0 \Rightarrow \underline{\underline{T(-t \mid (-t)^2 + 2t\cdot(-t) + 2) = (\overset{x}{-t} \mid \overset{y}{-t^2+2})}}$

Ortskurve: $x = -t \Rightarrow t = -x$; $\Rightarrow y = -(-x)^2 + 2 = \underline{\underline{-x^2+2}}$

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b) $f_t(x) = e^x - tx$; $f_t'(x) = e^x - t$; $f_t''(x) = e^x$; $t > 0$

Extrema notw. Bed $f_t'(x) = e^x - t = 0 \mid +t \Rightarrow e^x = t \mid \ln$

$\underline{\underline{x_1 = \ln(t)}}$

hinr. Bed: $f_t''(\ln(t)) = e^{\ln(t)} = t > 0$

$\underline{\underline{\Rightarrow}}\ T(\ln(t) \mid e^{\ln(t)} - t\cdot\ln(t)) = \underline{\underline{(\overset{x}{\ln(t)} \mid \overset{y}{t - t\cdot\ln(t)})}}$

Ortskurve: $x = \ln(t) \mid e^{\uparrow} \Rightarrow e^x = t$ einsetzen in

$y = t - t\cdot\ln(t) \Rightarrow y = e^x - e^x\cdot\ln(e^x) = e^x - e^x\cdot x$

$\underline{\underline{y = e^x\cdot(1-x)}}$

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c) $f_t(x) = e^x\cdot(x-t)$; $f_t'(x) = e^x\cdot(x-t) + e^x\cdot 1 = e^x\cdot(x-t+1)$

$f_t''(x) = e^x\cdot(x-t+1) + e^x\cdot 1 = e^x\cdot(x-t+1+1) = e^x\cdot(x-t+2)$

Extrema notw. Bed: $f_t'(x) = 0 = \underbrace{e^x}_{>0}\cdot(x-t+1)$

$\Rightarrow x - t + 1 = 0 \mid +t-1 \Rightarrow x_1 = t-1$

hinr. Bed: $f_t''(t-1) = e^{t-1}(\cancel{t}-1-\cancel{t}+2) = e^{t-1}\cdot 1 > 0$

$\underline{\underline{\Rightarrow}}\ T(t-1 \mid e^{t-1}\cdot(t-1-t)) = (t-1 \mid e^{t-1}\cdot(-1)) = \underline{\underline{(\overset{x}{t-1} \mid \overset{y}{-e^{t-1}})}}$

Ortskurve: $x = t-1 \Rightarrow t = x+1$ einsetzen in $-e^{t-1} = y$

$\underline{\underline{y}} = -e^{x+1-1} = \underline{\underline{-e^x}}$

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