-2-

Extrem- und Wendepunkte: $f'(x) = -16x\, e^{-2x^2}$

$$f''(x) = -16\, e^{-2x^2} + (-16x)\cdot(-4x)\, e^{-2x^2}$$
$$= (64x^2 - 16)\, e^{-2x^2}$$

Extrempkte: $f'(x) = 0 \land f''(x) \gtrless 0$

$$-16x\, e^{-2x^2} = 0 \qquad x_1 = 0$$

$$f''(0) = -16 < 0 \qquad f(0) = 4$$

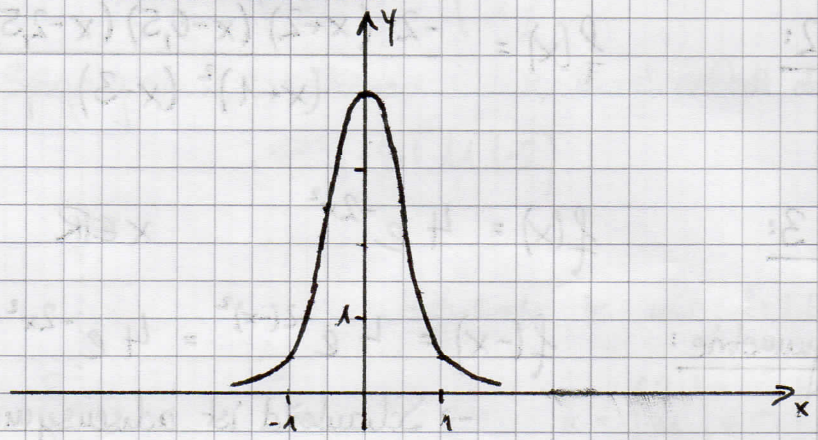
$\rightarrow$ Hochpunkt $H(0|4) = S_y$

Wendepunkte: (nur notw. Bed.) $f''(x) = 0$

$$(64x^2 - 16)\, e^{-2x^2} = 0$$
$$64x^2 - 16 = 0$$
$$x^2 = \frac{1}{4} \quad |\sqrt{\ }$$
$$|x| = \frac{1}{2} \qquad x_2 = -\frac{1}{2} \quad x_3 = \frac{1}{2}$$

$W_1\left(-\frac{1}{2} \middle| 4e^{-\frac{1}{2}}\right)$

$W_2\left(\frac{1}{2} \middle| 4e^{-\frac{1}{2}}\right)$



Aufgabe 4: a)

$$E: \vec{x} = \begin{pmatrix}1\\1\\1\end{pmatrix} + r\cdot\underbrace{\begin{pmatrix}2\\2\\0\end{pmatrix}}_{\vec{u}} + s\cdot\underbrace{\begin{pmatrix}-1\\3\\4\end{pmatrix}}_{\vec{v}}$$

$$\vec{n}' = \vec{u}\times\vec{v} = \begin{pmatrix}2\\2\\0\end{pmatrix} \times \begin{pmatrix}-1\\3\\4\end{pmatrix} = \begin{pmatrix}8-0\\0-8\\6+2\end{pmatrix} = \begin{pmatrix}8\\-8\\8\end{pmatrix}$$

$$\vec{n} = \begin{pmatrix}1\\-1\\1\end{pmatrix} \qquad \text{NF: } \left[\vec{x} - \begin{pmatrix}1\\1\\1\end{pmatrix}\right]\cdot\begin{pmatrix}1\\-1\\1\end{pmatrix} = 0$$