# Lösung 3. Klausur 17.1.08

**1]**
$u = \sin(3x+4)$
$u' = 3\cdot\cos(3x+4)$
$v = \cos(5x+6)$
$v' = -5\sin(5x+6)$

$\Rightarrow f'(x) = 3\cos(3x+4)\cos(5x+6) - 5\sin(5x+6)\cdot\sin(3x+4)$   2

**2]** $H(x) = -\frac{1}{3}\cdot\frac{1}{3}\sin(3x) = -\frac{1}{9}\sin(3x) + C$   2

**3] a)** $2x^2 + 1{,}5 > 0 \Rightarrow D = \mathbb{R}$   keine Pold   1

$t \neq 0 \Rightarrow$ keine Nullstellen   $\frac{1}{2}$

$f(0) = \frac{t}{1{,}5} = \frac{2}{3}t \Rightarrow S_y(0 \mid \frac{2}{3}t)$   $\frac{1}{2}$   1

$f(-x) = f(x) \Rightarrow$ symm. zur y-Achse   1

$\lim_{|x|\to\infty} f_t(x) = 0 \Rightarrow$ x-Achse ist waag. As   1

$f'(x) = t\cdot(-1)\cdot(2x^2+1{,}5)^{-2}\cdot 4x = \frac{-4tx}{(2x^2+1{,}5)^2}$

$u = -4tx$
$u' = -4t$
$v = (2x^2+1{,}5)^2$
$v' = 8x(2x^2+1{,}5)$

$f''(x) = \frac{-4t(2x^2+1{,}5)^{\cancel{2}} + 4tx\cdot 8x\cancel{(2x^2+1{,}5)}}{(2x^2+1{,}5)^{\cancel{4}\,3}}$

$f''(x) = \frac{-8tx^2 - 6t + 32tx^2}{(2x^2+1{,}5)^3}$

$f''(x) = \frac{24tx^2 - 6t}{(2x^2+1{,}5)^3}$   1

$f'(x) = 0 \Rightarrow x = 0$   $f''(0) = \frac{-6t}{1{,}5^3} < 0 \rightarrow H(0 \mid \frac{2}{3}t)$   1

$f''(x) = 0 \Rightarrow x^2 = \frac{6t}{24t} = 0{,}25$   $x_1 = 0{,}5$   $W_1(0{,}5 \mid \frac{t}{2})$

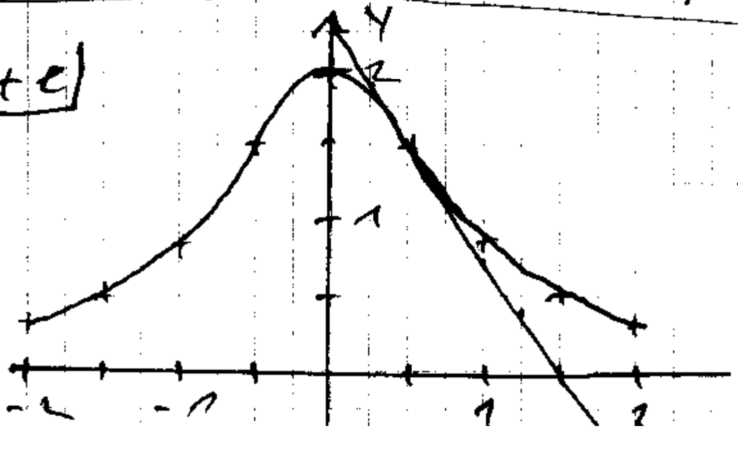
$x_2 = -0{,}5$   $W_2(-0{,}5 \mid \frac{t}{2})$

**3b** $O_t$ HP: $x = 0$   1

$O_{t_1}$ WP: $x = 0{,}5$

$O_{t_2}$ WP: $x = -0{,}5$   1

**3c+e**



| x | y |
|---|---|
| 0 | 2 |
| 0,5 | 1,5 |
| 1 | 0,85 |
| 1,5 | 0,5 |

30 : 35 = 0,8
280
 200
 175
  250

30 : 95 = 0,3
285
 150