Klausur 13-1 13B 2.10.2008

Lösung Pflichtteil

I-1 (2P)

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

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

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

I-2 (4P)

$G(x) = x\cdot \ln(x) - x$

$G'(x) = 1\cdot \ln(x) + x\cdot \frac{1}{x} - 1 = \ln(x)$ 2P

$\int_1^e \ln(x)\, d(x) = G(e) - G(1)$ 1P

$= e\cdot \ln e - e - (1\cdot \ln(1) - 1)$

$= 1$ 1P

I-3 (8P)

$3e^{2x} + 12 = 15e^x \qquad z = e^x$

$z^2 - 5z + 4 = 0$

$z_{1,2} = 2{,}5 \pm \sqrt{6{,}25-4}$

$z_1 = 1$ 1 $\quad e^x = 1 \quad x_1 = 0$ 1

$z_2 = 4$ 1 $\quad e^x = 4 \quad x_2 = \ln 4$ 1 4P

$[\ln(2x+3)]^2 - 4\ln(2x+3) = 0$

$z^2 - 4z = 0 = z(z-4)$

$z_1 = \ln(2x+3) = 0$ 1

$2x+3 = 1 \qquad x_1 = -1$ 1

$z_2 = \ln(2x+3) = 4$ 1

$2x+3 = e^4 \qquad x_2 = \frac{e^4-3}{2}$ 1 4P

I-4 (4P)

$\text{I} \quad 2 + t = 2 + 2k \qquad t - 2k = 0$

$\text{II} \quad 3 + t = 6 - k \qquad t + k = 3 \;\big|\; -$

$3k = 3$

$k = 1$ 1P

Probe:

$\text{III} \quad 9 - 4\cdot 2 = 3 + 1\cdot(-2) \qquad t = 0 + 2k$

$t = 2$ 1P

$\Rightarrow k = 1$ in h: $S(4|5|1)$

od. $t = 2$ in g: $S(4|5|1)$ 2P