

Klausur Nr. 3

1.) $f(x) = x^2 \cdot e^{-3x+7}$
 $f'(x) = 2x \cdot e^{-3x+7} + x^2 \cdot e^{-3x+7} \cdot (-3)$ (1)
 $f'(x) = e^{-3x+7} \cdot x \cdot (2 - 3x)$ (1)

2.) $e^{3x} - 4 - \frac{21}{e^{3x}} = 0 \quad | \quad \text{sub: } e^{3x} = u$ (1)

$u - 4 - \frac{21}{u} = 0 \quad | \cdot u$

$u^2 - 4u - 21 = 0$

$u_{1,2} = +2 \pm \sqrt{4+21} = 2 \pm 5$ (1)

$u_1 = 7$

$e^{3x} = 7 \Rightarrow 3x = \ln(7) \Rightarrow x = \frac{\ln(7)}{3}$ (1)

$u_2 = -3$

$e^{3x} = -3$ ⚡

3.) $F(x) = \frac{2}{\sqrt{x}} - 1 = 2 \cdot x^{-\frac{1}{2}} - 1$

a) $F(x) = 2 \cdot \frac{x^{\frac{1}{2}}}{\frac{1}{2}} - x = 4 \cdot x^{\frac{1}{2}} - x = \underline{4\sqrt{x} - x}$ (1)

b.) $\int_4^9 \left(\frac{2}{\sqrt{x}} - 1\right) dx = \left[4\sqrt{x} - x\right]_4^9 = 4 \cdot 3 - 9 - \{4 \cdot 2 - 4\}$ (2)
 $= 12 - 9 - 8 + 4 = \underline{-1}$

c) $F(1) = 4\sqrt{1} - 1 + C = 0$ (1)

$3 + C = 0$

$C = -3$ (1)

ges (2)