Lösungen A1 bis A3

1a) $f'(x) = (-20x - 20) \cdot e^{-x^2 - 2x}$ $g'(x) = e^x \cdot (11 + x)$

$h'(x) = 30x^2 e^{x^2} + 10x^3 \cdot 2x \cdot e^{x^2} = e^{x^2}(30x^2 + 20x^4)$

1b) $F(x) = -5 \cdot e^{-2x} + c$ $g(x) = -x^2 - x + 12 \rightarrow G(x) = -\frac{1}{3}x^3 - \frac{1}{2}x^2 + 12x + c$

$h(x) = x^{\frac{2}{3}} + 2x^{-2} \rightarrow H(x) = \frac{3}{5}x^{\frac{5}{3}} - 2x^{-1} = \frac{3}{5}\sqrt[3]{x^5} - \frac{2}{x} + c$

2a) $z = e^x \rightarrow z^2 - z = z(z - 1) = 0$ $\rightarrow z_1 = e^x = 0$ entfällt; $z_2 = e^x = 1 \rightarrow x = 0$

2b) $z = e^x \rightarrow z^2 - 3z - 4 = 0$ $\rightarrow z_1 = -1$ entfällt; $z_2 = e^x = 4 \rightarrow x = \ln(4)$

2c) $z = e^x \rightarrow z^2 - 5z + 4 = 0$ $\rightarrow z_1 = e^x = 1 \rightarrow x = 0; z_2 = e^x = 4 \rightarrow x = \ln(4)$

3a) $\log_4 128 = \frac{\log_2 128}{\log_2 4} = \frac{7}{2}$ 3b) $8^{\frac{4}{3}} = \left(8^{\frac{1}{3}}\right)^4 = \sqrt[3]{8}^4 = 2^4 = 16$ 3c) $e^{2\ln(3)} = \left(e^{\ln(3)}\right)^2 = 3^2 = 9$