

Prüfung 1 Teil DFO2 (1hr)

ex 1 $f(x) = \frac{2x^2 - 1}{2x^3 - 3x + 1} = \frac{1}{3} \left(\frac{6x - 3}{2x^3 - 3x + 1} \right)$

[1/3] $\Rightarrow F(x) = \frac{1}{3} \int \ln |2x^3 - 3x + 1|$ (3)

ex 2 (a) $\int e^{-12x} dx = \int \frac{-1}{12} [e^{-12x} \cdot (-12)] dx = -\frac{1}{12} e^{-12x} + c$ (2)

[1/4] (b) $\int \frac{\frac{1}{x} + 1}{\ln(x) + x} dx = \ln | \ln(x) + x | + c$ (2)

ex 3 (a) $\frac{3}{4} \left[\int_{\frac{2}{3}}^3 \frac{-3}{1-3x} dx + \int \frac{-1}{4-x} dx \right]$

[7/1] $= \frac{3}{4} \left[-\frac{2}{3} \ln |1-3x| \Big|_2^3 + \ln |4-x| \Big|_2^3 \right]$
 $= \frac{3}{4} \left[-\frac{2}{3} (\ln |-8| - \ln |-5|) + (\ln 1 - \ln 2) \right]$
 $= \frac{3}{4} \left[-\frac{2}{3} \cdot \ln \left(\frac{8}{5} \right) - \ln(2) \right]$ (4)

(b) $\int_{e/2}^e e^{x-e} dx = e^{x-e} \Big|_{e/2}^e = e^0 - e^{-e/2} = 1 - e^{-e/2}$ (3)