Aufgabe 9.1

(1) $\int_{-\infty}^{\infty} \frac{1}{x^2+3x^2+2}dx$

$= \int_{-\infty}^{\infty} \frac{1}{(x-2)(x-1)}dx = \int_{-\infty}^{\infty} \frac{1}{x-2}dx - \int_{-\infty}^{\infty} \frac{1}{x-1}dx$

$= \Big[\ln|x-2|\Big]_{-\infty}^{2} + \Big[\ln|x-2|\Big]_{2}^{\infty} - \Big[\ln|x-1|\Big]_{-\infty}^{1} - \Big[\ln|x-1|\Big]_{1}^{\infty}$

= "Werte existieren nicht"

(2) $\int_{0}^{e} x\ln(x)dx$

$= \lim_{z\to 0}\Big(\Big[\frac{1}{2}x^2\ln(x)\Big]_{z}^{e} - \int_{z}^{e}\frac{1}{2}x^2dx\Big) \overset{\text{l.H}}{=} \frac{1}{2}e^2$

(3) $\int \frac{x^6}{x^4+3x^2+2}dx$

$= \int (x^2-3)\,\frac{7x^2+6}{x^4+3x^2+2}dx = \int\Big[(x^2-3) - \Big(\frac{1}{x^2+1}\Big) + \Big(\frac{8}{x^2+2}\Big)\Big]dx$

$= \frac{1}{3}x^3 - 3x - \arctan(x) + 4\sqrt{2}\arctan(\frac{x}{\sqrt{2}})$

Zu (1)