Analysis 2, SS 2008, 5. Übungsblatt

23. Für zweimal stetig-differenzierbare Funktionen u, v forme man das Integral

$$\int \left[u(x)v''(x) - v(x)u''(x) \right] \, dx$$

um und berechne damit

$$\int \left[\frac{x+3}{x^2} + \frac{2x+18}{x^4} \right] \sin(x) \, dx.$$

24. Man ermittle die folgenden Integrale:

(a) $\displaystyle\int e^x \sin(2x) \, dx$

(b) $\displaystyle\int (\ln x)^2 \, dx$

(c) $\displaystyle\int \frac{x \, dx}{\sqrt{x^2 + x + 1}}$

(d) $\displaystyle\int \frac{dx}{\sin^2 x \cos^4 x}$

(e) $\displaystyle\int \frac{\ln x \, dx}{x(\ln^2 x - \ln x + 1)}$

(f) $\displaystyle\int \frac{\sinh(x)}{1 + e^{2x}} \, dx$

(g) $\displaystyle\int 2^x \coth(2^{1+x}) \, dx$

(h) $\displaystyle\int \frac{dx}{\sqrt{x-1} - \sqrt{x-2}}$

(i) $\displaystyle\int \frac{dx}{x(1 + \sqrt{x-1})}$

(j) $\displaystyle\int \frac{dx}{\sqrt{3 - 2x - x^2}}$

(k) $\displaystyle\int \frac{dx}{(1+x^2)\sqrt{1-x^2}}$

(l) $\displaystyle\int \frac{\arctan \sqrt{x}}{\sqrt{x}} \, dx$

(m) $\displaystyle\int \frac{\sqrt{1+x^6}}{x} \, dx$

(n) $\displaystyle\int \frac{x^2 + 1}{x\sqrt{x^4 - x^2 + 1}} \, dx$