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Ana 1 – Blatt 13

Aufg. 1 – Unbestimmte Integrale

(3) $\int x \cdot \arcsin(x)\,dx = \left[\frac{1}{2}x^2 \cdot \arcsin(x)\right] - \int \frac{1}{2}x^2 \cdot \frac{1}{(1-x^2)^{\frac{1}{2}}}\,dx$

x: u'; $\arcsin(x)$: v; $\frac{1}{2}x^2$: u; $u \cdot v$; $u \cdot v'$

$\left(\frac{1}{2}x^2\right)' = \frac{2}{2}x = x$

$(\arcsin(x))' = \frac{1}{(1-x^2)^{\frac{1}{2}}} = \frac{1}{\sqrt{1-x^2}}$

$= \left[\frac{1}{2}x^2 \cdot \arcsin(x)\right] - \int \frac{1}{2}x^2 \cdot \frac{1}{z^{\frac{1}{2}}} \cdot \frac{dz}{2x}$

Zzz (Substitution) $z = 1 - x^2$

$z' = 2x = \frac{dz}{dx} \quad | \cdot dx$

$2x\,dx = dz \quad | : 2x$

$dx = \frac{dz}{2x}$

$= \left[\frac{1}{2}x^2 \arcsin(x)\right] - \int \frac{x^2}{2} \cdot \frac{1}{2x \cdot z^{\frac{1}{2}}}\,dz = \left[\frac{1}{2}x^2 \arcsin(x)\right] - \int \frac{1}{2}x \cdot \frac{1}{2z^{\frac{1}{2}}}$

Wie geht's weiter Zzz