Calculus II

Integrals of the form $\int x \sin(mx)\mathbf{d}x$

Todor Milev

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Integration by parts: $\int u\mathrm{d}v = uv - \int v\mathrm{d}u.$

Example

$$\begin{aligned}\int x\sin x\mathrm{d}x &= \int x\mathrm{d}(-\cos x) \qquad \Big| \ \sin x\mathrm{d}x = \mathrm{d}(-\cos x)\\ &= x(-\cos x) - \int(-\cos x)\mathrm{d}x\\ &= -x\cos x + \int \cos x\mathrm{d}x\\ &= -x\cos x + \sin x + C\end{aligned}$$