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November 19, 2024

Inhaltsverzeichnis

1 Partielle Integration

$\int x^2 \cdot \cos(x)\, dx$

$\Rightarrow \int u(x) \cdot v'(x)\, dx = u(x) \cdot v(x) - \int u'(x) \cdot v(x)\, dx$

$u(x) = x^2 \qquad u'(x) = 2x$
$v'(x) = \cos(x) \qquad v(x) = \sin(x)$

$\int (x^2 \cdot \cos(x))\, dx = x^2 \cdot \sin(x) - \int (2x \cdot \sin(x))\, dx$

$u_1(x) = 2x \qquad u_1'(x) = 2$
$v_1'(x) = \sin(x) \qquad v_1(x) = -\cos(x)$

$\int (2x \cdot \sin(x))\, dx = 2x \cdot (-\cos(x)) - \int (2 \cdot (-\cos(x)))\, dx$

$= -2x \cdot \cos(x) + 2 \cdot \sin(x)$

$\Rightarrow \int (x^2 \cdot \cdot \cos(x))\, dx = x^2 \cdot \sin(x) - (-2x \cdot \cos(x) + 2 \cdot \sin(x))$

$= x^2 \cdot \sin(x) + 2x \cdot \cos(x) - 2 \cdot \sin(x)$