# Review: Integrals

$$\int x^3 \, dx = \frac{x^4}{4} + C$$

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$$\int \frac{2x \, dx}{(x^2+1)^3}$$

let $u = x^2 + 1$
$du = 2x \, dx$

$$= \int \frac{du}{u^3}$$

$$= \int u^{-3} \, du$$

$$= \frac{u^{-2}}{-2} + C$$

$$= \frac{(x^2+1)^{-2}}{-2} + C$$

$$= \frac{-1}{2(x^2+1)^2} + C$$

either

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notation for definite integrals with substitution:

$$\int_2^3 xe^{x^2}\,dx$$

$$U = x^2$$
$$du = 2x\,dx$$
$$\frac{du}{2} = x\,dx$$

$$= \int_4^9 e^u \frac{du}{2}$$

$$= \left.\frac{e^u}{2}\right|_4^9$$

$$= \frac{e^9}{2} - \frac{e^4}{2}$$

$$= \int_{x=2}^{x=3} e^u \frac{du}{2}$$

$$= \left.\frac{e^u}{2}\right|_{x=2}^{x=3}$$

$$= \left.\frac{e^{x^2}}{2}\right|_2^3$$

$$= \frac{e^9}{2} - \frac{e^4}{2}$$