**Selected definite and indefinite Integrals**

$$\int_0^\infty e^{-ax^2}\,dx = \frac{1}{2}\sqrt{\frac{\pi}{a}}$$

$$\int_0^\infty xe^{-ax^2}\,dx = \frac{1}{2a}$$

$$\int_0^\infty x^2e^{-ax^2}\,dx = \frac{1}{4a}\sqrt{\frac{\pi}{a}}$$

$$\int_0^\infty x^3e^{-ax^2}\,dx = \frac{1}{2a^2}$$

$$\int_0^\infty x^n e^{-ax}dx = \frac{1\times 2\times 3\ldots\times n}{a^{n+1}}$$

$$\int(\sin^2 ax)dx = \frac{x}{2} - \frac{\sin 2ax}{4a} + C$$

$$\int(\sin ax)(\cos ax)dx = \frac{\sin^2 ax}{2a} + C$$

$$\int x(\sin^2 ax)dx = \frac{x^2}{4} - \frac{x\sin 2ax}{4a} - \frac{\cos 2ax}{8a^2} + C$$

$$\int x(\cos^2 ax)dx = \frac{x^2}{4} + \frac{x\sin 2ax}{4a} + \frac{\cos 2ax}{8a^2} + C$$

**Physical Constants**

| Name | symbol | value (SI units) |
|---|---|---|
| Avogadro's number | $N_A$ | $6.022 \times 10^{23}$ |
| Speed of light in vacuum | $c$ | $2.9979 \times 10^{8}$ m/s |
| Plank constant | $h$ | $6.626 \times 10^{-34}$ J s |
| "hbar" | $\hbar = h/2\pi$ | $1.5457 \times 10^{-34}$ J s |
| electron charge | $e$ | $1.6021 \times 10^{-19}$ C |
| electron mass | $m_e$ | $9.1094 \times 10^{-31}$ kg |
| Bohr Radius | $a_0$ | $5.29177 \times 10^{-11}$ m |
| Vaccum permittivity | $\varepsilon_0$ | $8.85419 \times 10^{-12}$ $C^2/(J\ m)$ |