1 Integrals

Gamma Function:

$$\Gamma(z) \equiv \int_0^\infty x^{z-1} e^{-x} \mathrm{d}x \tag{1}$$

with specific results

$$\Gamma(z+1) = z\Gamma(z) \qquad \Gamma(n) = (n-1)! \qquad \Gamma(\tfrac{1}{2}) = \sqrt{\pi} \tag{2}$$

Gaussian Integrals:

$$I_n = \frac{1}{\sqrt{2\pi}\sigma} \int_{-\infty}^{\infty} \mathrm{d}x\, e^{-x^2/2\sigma^2} x^n \tag{3}$$

with specific results

$$I_0 = 1 \quad I_2 = \sigma^2 \quad I_4 = 3\sigma^4 \quad I_6 = 15\sigma^6 \tag{4}$$