

CONSTANTS

$$\begin{array}{lll}
 k = 9.0 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2 & e = 1.6 \times 10^{-19} \text{ C} & g = 9.8 \text{ m/s}^2 \\
 \epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{N}\cdot\text{m}^2 & m_e = 9.11 \times 10^{-31} \text{ kg} & m_p = m_n = 1.67 \times 10^{-27} \text{ kg} \\
 \mu_0 = 4\pi \times 10^{-7} \text{ T}\cdot\text{m/A} & c = 3.0 \times 10^8 \text{ m/s} &
 \end{array}$$

BINOMIAL EXPANSION

$$(1+x)^n = 1 + nx + \frac{n(n-1)x^2}{2!} + \dots$$

INTEGRALS

$$\begin{array}{ll}
 \int \frac{dx}{x} = \ln(x) & \int \frac{xdx}{\sqrt{x^2+a^2}} = \sqrt{x^2+a^2} \\
 \int \frac{xdx}{(x^2+a^2)^{\frac{3}{2}}} = \frac{-1}{\sqrt{x^2+a^2}} & \int \frac{a^2 dx}{(x^2+a^2)^{\frac{3}{2}}} = \frac{x}{\sqrt{x^2+a^2}} \\
 \int \frac{dx}{\sqrt{x^2+a^2}} = \ln(x + \sqrt{x^2+a^2}) &
 \end{array}$$

$$\int (\sin^2 ax) dx = -\frac{1}{2a} \cos(ax) \sin(ax) + \frac{1}{2}x \quad \int (\cos^2 ax) dx = \frac{1}{2a} \sin(ax) \cos(ax) + \frac{1}{2}x$$

TRIGONOMETRY

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \cos(\alpha)\sin(\beta) \quad \cos(\alpha \pm \beta) = \cos(\alpha)\cos(\beta) \mp \sin(\alpha)\sin(\beta)$$

LRC CIRCUITS

$$\begin{array}{ll}
 \alpha = \frac{R}{2L} & \omega^2 = \omega_0^2 - \alpha^2 \\
 \tan\phi = \frac{1}{R}(X_L - X_C) & Z = \sqrt{R^2 + (X_L - X_C)^2} = \frac{R}{\cos\phi}
 \end{array}$$