Potentially useful formulas. You may detach this page.

$$g = 9.81 \text{ m/s}^2$$

$$e = 1.60 \times 10^{-19} \text{ C}$$

$$m_\text{e} = 9.11 \times 10^{-31} \text{ kg}$$

$$m_\text{p} = 1.67 \times 10^{-27} \text{ kg}$$

$$k_\text{e} = \frac{1}{4\pi\varepsilon_0} = 8.99 \times 10^9 \text{ N m}^2/\text{C}^2$$

$$\varepsilon_0 = 8.85 \times 10^{-12} \, \frac{\text{s}^4\text{A}^2}{\text{kg m}^3}$$

$$\mu_0 = 4\pi \times 10^{-7} \, \frac{\text{kg m}}{\text{s}^2\text{A}^2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$v = v_0 + a_\text{c}\Delta t$$

$$\Delta x = v_0\Delta t + \frac{1}{2}a_\text{c}\left(\Delta t\right)^2$$

$$v^2 = v_0^2 + 2a_\text{c}\Delta x$$

$$\vec{F} = m\vec{a}$$

$$\omega = \frac{2\pi}{T} = \sqrt{\frac{g}{\ell}}$$

$$\vec{F}_{12} = \frac{k_\text{e}q_1q_2}{r^2}\hat{r}_{12}$$

$$\vec{F}_\text{e} = q\vec{E}$$

$$\vec{E}_q = \frac{1}{4\pi\varepsilon_0}\frac{q}{r^2}\hat{r}$$

$$E_\text{line} = \frac{|\lambda|}{2\pi\varepsilon_0 r}$$

$$E_\text{plane} = \frac{|\sigma|}{2\varepsilon_0}$$

$$\vec{E}_\text{ring} = \frac{k_\text{e}Qz}{\left(r^2 + z^2\right)^{3/2}}\,\hat{k}$$

$$\Phi_\text{e} = \int_\text{surface} \vec{E}\cdot d\vec{A}$$

$$\oint \vec{E}\cdot d\vec{A} = \frac{q_\text{encl}}{\varepsilon_0}$$

$$U_\text{elec} = \frac{k_\text{e}q_1q_2}{r}$$

$$V = \frac{U}{q}$$

$$\Delta V = -\int_{P_1}^{P_2} \vec{E}\cdot d\vec{\ell}$$

$$V_q = \frac{k_\text{e}q}{r}$$

$$F_s = -\frac{dU}{ds}$$

$$E_s = -\frac{dV}{ds}$$

$$C = \frac{Q}{V_C}$$

$$C = \varepsilon_0\frac{A}{d}$$

$$C_\text{eq} = \sum_i C_i \quad \text{(parallel)}$$

$$\frac{1}{C_\text{eq}} = \sum_i \frac{1}{C_i} \quad \text{(series)}$$

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$$U_C = \frac{1}{2}QV_C = \frac{1}{2}CV_C^2 = \frac{Q^2}{2C}$$

$$I_{\text{avg}} = \frac{\Delta Q}{\Delta t}$$

$$I = \frac{dQ}{dt}$$

$$I = qnv_d A$$

$$J = \frac{I}{A} = \sigma E$$

$$R = \rho\frac{L}{A}$$

$$V_R = IR$$

$$P = \frac{dE}{dt}$$

$$P_R = IV_R = \frac{V_R^2}{R} = I^2 R$$

$$\sum I_{\text{in}} = \sum I_{\text{out}}$$

$$\Delta V_{\text{loop}} = \sum_i \Delta V_i = 0$$

$$R_{\text{eq}} = \sum_i R_i \quad \text{(series)}$$

$$\frac{1}{R_{\text{eq}}} = \sum_i \frac{1}{R_i} \quad \text{(parallel)}$$

$$\left|\vec{A} \times \vec{B}\right| = AB\sin\theta$$

$$\vec{F}_q = q\vec{v} \times \vec{B}$$

$$\vec{F}_{\text{wire}} = I\vec{\ell} \times \vec{B}$$

$$T = \frac{2\pi m}{qB}$$

$$\vec{B}_{\text{point charge}} = \frac{\mu_0}{4\pi}\frac{q\vec{v} \times \hat{r}}{r^2}$$

$$\vec{B}_{\text{current segment}} = \frac{\mu_0}{4\pi}\frac{I\Delta\vec{\ell} \times \hat{r}}{r^2}$$

$$B_{\text{wire}} = \frac{\mu_0 I}{2\pi r}$$

$$B_{\text{loop}} = \frac{\mu_0 I}{2r}$$

$$\oint \vec{B} \cdot d\vec{\ell} = \mu_0 I_{\text{encl}}$$

$$B_{\text{solenoid}} = \mu_0 \frac{N}{L} I$$

$$F_{\text{parallel wires}} = \frac{\mu_0 \ell I_1 I_2}{2\pi d}$$

$$\mathcal{E} = v\ell B$$

$$\Phi_B = \int_{\text{surface}} \vec{B} \cdot d\vec{A}$$

$$\mathcal{E} = \left|\frac{d\Phi_B}{dt}\right|$$