

EXAM 1 Formulas

$$\vec{F} = q\vec{E}$$

$$\vec{F} = k \frac{q_1 q_2}{r_{12}^2} \hat{r}_{12} = \frac{1}{4\pi\epsilon_0} \frac{q_1 q_2}{r_{12}^2} \hat{r}_{12}$$

$$\phi_E = \oint \vec{E} \cdot d\vec{A}$$

$$\oint \vec{E} \cdot d\vec{A} = \frac{Q_{\text{enclosed}}}{\epsilon_0}$$

$$\vec{E} = \int_{\text{vol}} k \frac{dQ}{r^2} \hat{r}$$

$V = \text{work/charge}$

$$V_{\text{point charge}} = \frac{kQ}{r}$$

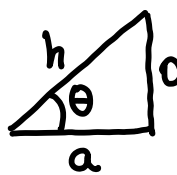
$$V = \int_{\text{vol}} \frac{k dQ}{r}$$

$$E_s = -dV/ds$$

$$|e| = 1.6 \times 10^{-19} \text{ coulombs}$$

$$k = 8.99 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2}$$

$$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2/\text{Nm}^2$$


$$\sin \theta = \frac{0}{h} \quad \cos \theta = \frac{a}{h}$$

$$\tan \theta = 0/a$$

$$\text{Sphere: } A = 4\pi r^2 \quad V = \frac{4}{3}\pi r^3$$

$$\text{cylinder: } A = 2\pi rL + 2\pi r^2$$
$$V = \pi r^2 L$$

$$\int u^n du = \frac{u^{n+1}}{n+1}$$

$$\int \frac{du}{u} = \ln|u|$$

$$\int e^u du = e^u$$

$$\int \frac{x dx}{(x^2+a^2)^{1/2}} = \sqrt{x^2+a^2}$$