Announcements

- Homework 3 due Monday night
  - Post questions to Campuswire over the weekend!
- I'll be out of the office for much of the afternoon at the SCRP talks
- Monday Reading: Ch 2.3 and Ch 2.4

Evaluate

$$\int_{\text{all space}} (r^2 + \vec{\boldsymbol{r}} \cdot \vec{\mathbf{a}} + a^2)\delta^3(\vec{\boldsymbol{r}} - \vec{\mathbf{a}})\, d\tau$$

A. $3a^2$

B. $2a^2$

C. a^2

D. 0

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A. $\frac{q}{\epsilon_0}$
B. $\frac{q}{\epsilon_0}\delta^3(\vec{\boldsymbol{r}})$
C. $\frac{q}{\epsilon_0}\hat{\boldsymbol{r}}$
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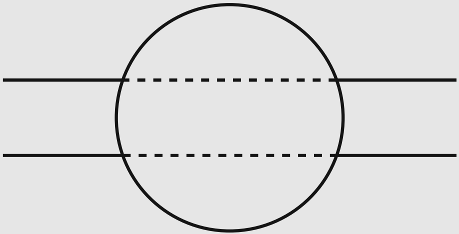
Consider a small charged bead pierced by a long straight narrow charged wire, as seen below. Could you use Gauss's Law to solve for the electric field a short distance above the bead?



A. Yes, just choose the correct surface.
B. Yes, but it requires multiple surfaces.
C. Yes, but only if the bead and wire have opposite charges.
D. No, this doesn't have the needed symmetry.

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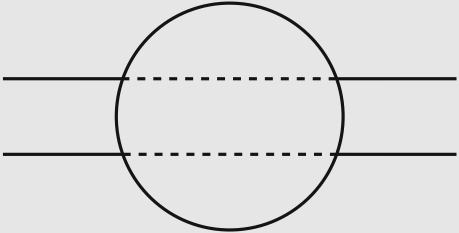

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Does superposition apply to electric potential, V?

$$V_{tot} \stackrel{?}{=} \sum_i V_i = V_1 + V_2 + V_3 + \cdots$$

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You can conclude that:

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We usually choose the reference point $\mathcal{O}$ to be 0 at $\vec{\boldsymbol{r}} = \infty$ when calculating the potential of a point charge. ($V = kq/r$) How does this potential change if we choose our reference point to be $V(R) = 0$ when R is close to q?

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C. $V(r)$ doesn't change
D. Impossible to say without knowing how close it gets

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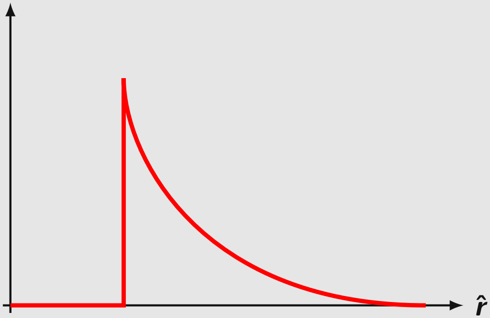


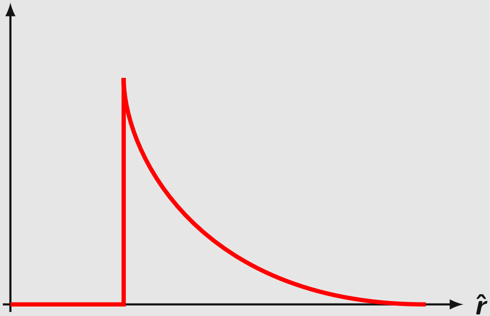
Could the above be a plot of $\left|\vec{\mathbf{E}}\right|$? or $V(r)$? (Assuming for some physical situation)

A. Could be $E(r)$ or $V(r)$

B. Could be $E(r)$, but not $V(r)$

C. Can't be $E(r)$, but could be $V(r)$

D. Can't be either



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