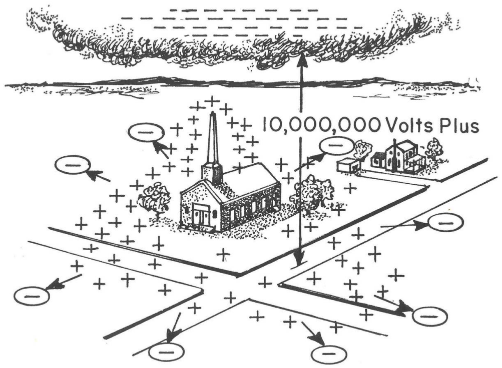
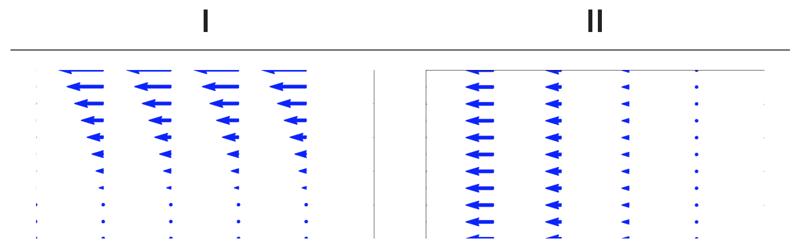
ELECTRIC POTENTIAL



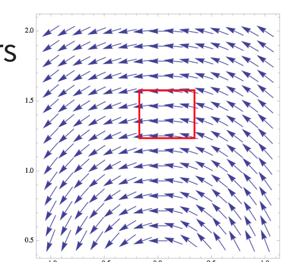
Which of the following two fields has zero curl?



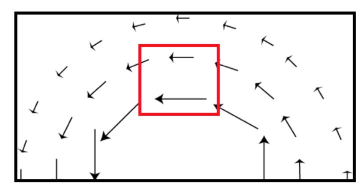
A. Both do.
B. Only I is zero
C. Only II is zero
D. Neither is zero
E. ???

What is the curl of the vector field, $\mathbf{v} = c\hat{\phi}$, in the region shown below?

A. non-zero everywhere
B. zero at some points, non-zero at others
C. zero curl everywhere

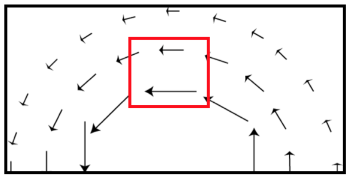


What is the curl of this vector field, in the red region shown below?



A. non-zero everywhere in the box
B. non-zero at a limited set of points
C. zero curl everywhere shown
D. we need a formula to decide

What is the curl of this vector field, $\mathbf{v} = \frac{c}{s}\hat{\phi}$, in the red region shown below?



A. non-zero everywhere in the box
B. non-zero at a limited set of points
C. zero curl everywhere shown

Is it mathematically ok to do this?

$$\mathbf{E} = \frac{1}{4\pi\varepsilon_0}\int_V \rho(\mathbf{r}')d\tau'\left(-\nabla\frac{1}{\mathfrak{R}}\right)$$

$$\longrightarrow \mathbf{E} = -\nabla\left(\frac{1}{4\pi\varepsilon_0}\int_V \rho(\mathbf{r}')d\tau'\frac{1}{\mathfrak{R}}\right)$$

A. Yes
B. No
C. ???

If $\nabla \times \mathbf{E} = 0$, then $\oint_C \mathbf{E}\cdot d\mathbf{l} =$

A. 0
B. something finite
C. ∞
D. Can't tell without knowing C

Can superposition be applied to electric potential, V?

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

A. Yes
B. No
C. Sometimes

The potential is zero at some point in space.

You can conclude that:

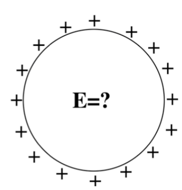
A. The E-field is zero at that point
B. The E-field is non-zero at that point
C. You can conclude nothing at all about the E-field at that point

The potential is constant everywhere along a line in space.

You can conclude that:

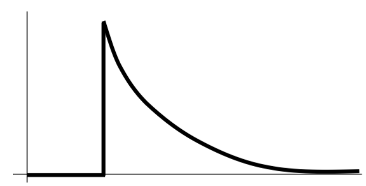
A. The E-field has a constant magnitude along the line.
B. The E-field is zero along that line.
C. You can conclude nothing at all about the magnitude of $\mathbf{E}$ along that line.

A spherical *shell* has a uniform positive charge density on its surface. (There are no other charges around.)



What is the electric field *inside* the sphere?

A. $\mathbf{E} = 0$ everywhere inside
B. $\mathbf{E}$ is non-zero everywhere in the sphere
C. $\mathbf{E} = 0$ only that the very center, but non-zero elsewhere inside the sphere.
D. Not enough information given



Could this be a plot of $|\mathbf{E}(r)|$? Or $V(r)$? (for SOME physical situation?)

A. Could be $E(r)$, or $V(r)$
B. Could be $E(r)$, but can't be $V(r)$
C. Can't be $E(r)$, could be $V(r)$
D. Can't be either
E. ???