Which of the following are vectors?

(I) Electric field, (II) Electric flux, and/or (III) Electric charge

A. I only
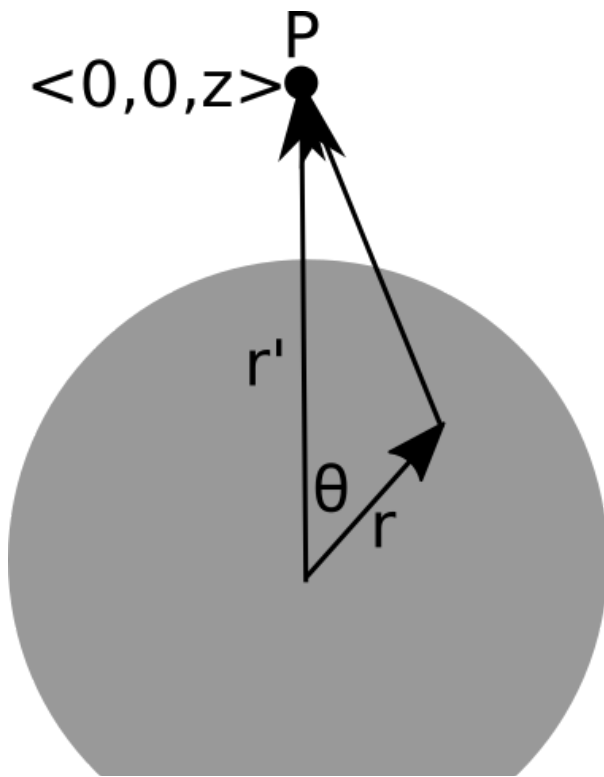B. I and II only
C. I and III only
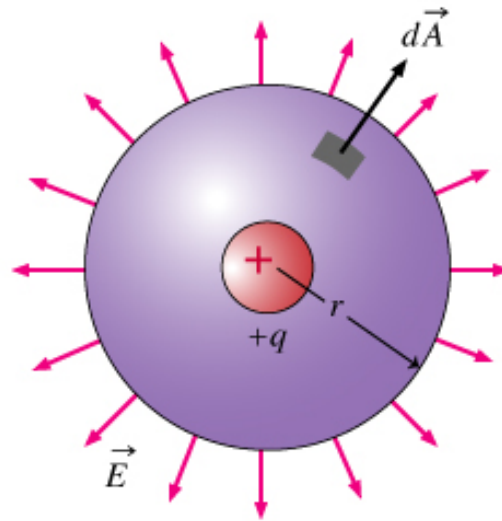D. II and III only
E. I, II, and II

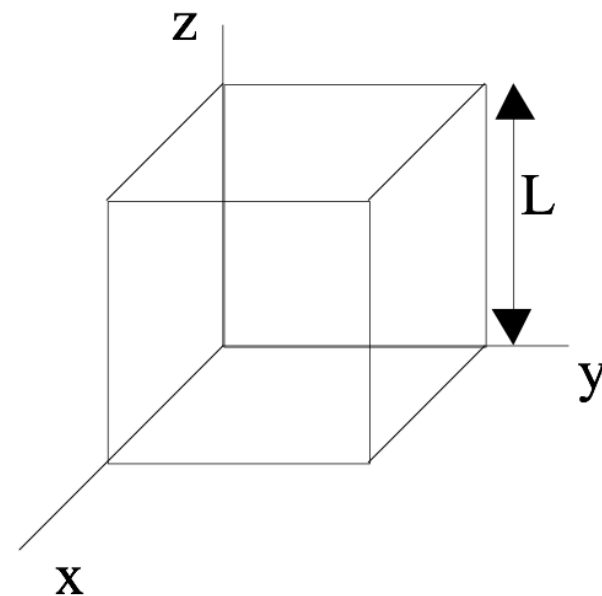Given the location of the little bit of charge (dq), what is $|\vec{\mathfrak{R}}|$?

A. $\sqrt{z^2 + r'^2}$

B. $\sqrt{z^2 + r'^2 - 2zr' \cos\theta}$

C. $\sqrt{z^2 + r'^2 + 2zr' \cos\theta}$

D. Something else

GAUSS' LAW

$$\oint_S \mathbf{E} \cdot d\mathbf{A} = \int_V \frac{\rho}{\varepsilon_0} d\tau$$

The space in and around a cubical box (edge length L) is filled with a constant uniform electric field, $\mathbf{E} = E_0\hat{y}$. What is the TOTAL electric flux $\oint_S \mathbf{E} \cdot d\mathbf{A}$ through this closed surface?

A. 0

B. E_0L^2

C. $2E_0L^2$

D. $6E_0L^2$

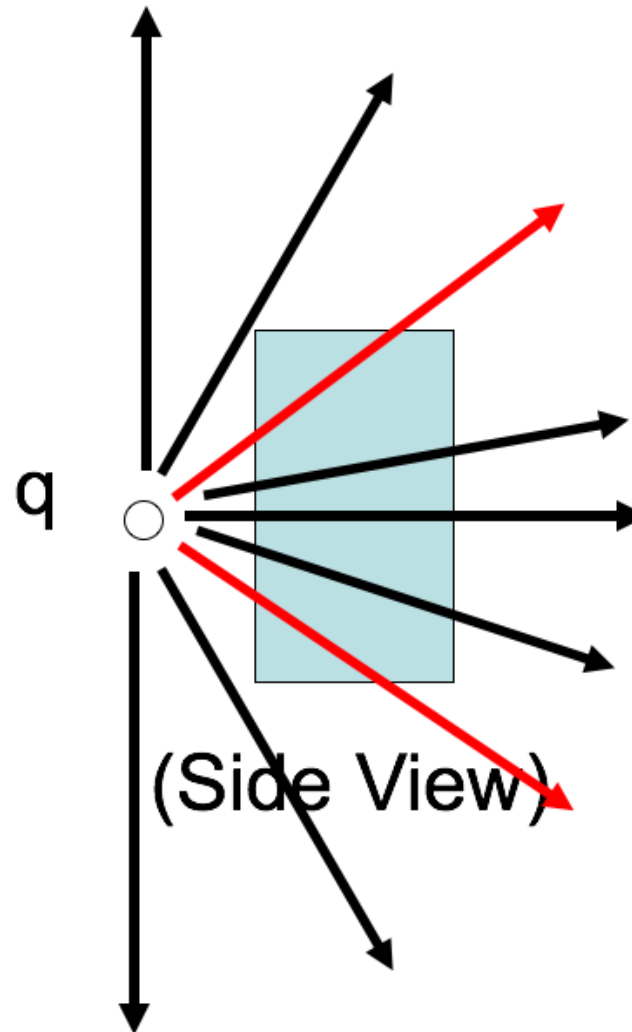E. We don't know $\rho(r)$, so can't answer.

A positive point charge $+q$ is placed outside a closed cylindrical surface as shown. The closed surface consists of the flat end caps (labeled A and B) and the curved side surface (C). What is the sign of the electric flux through surface C?

(Side View)

A. positive

B. negative

C. zero

Let's get a better look at the side view.

(Side View)

A positive point charge $+q$ is placed outside a closed cylindrical surface as shown. The closed surface consists of the flat end caps (labeled A and B) and the curved side surface (C). What is the sign of the electric flux through surface C?

A

C

q

B

q

(Side View)

A. positive

B. negative

C. zero

Which of the following two fields has zero divergence?

I   II
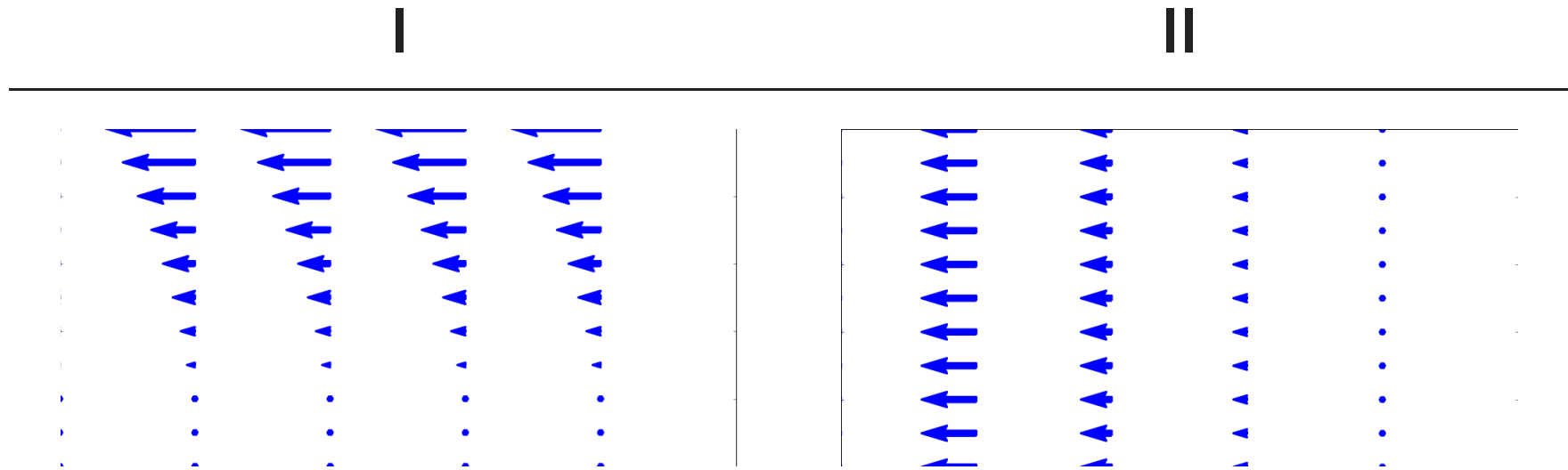
A. Both do.

B. Only I is zero

C. Only II is zero

D. Neither is zero

E. ???

What is the divergence in the boxed region?

A. Zero
B. Not zero
C. ???