ICEs: GAUSS' LAW

Name: Key

1) Conceptual questions:

(a) Far from a charge distribution, you measure an electric field strength of 900 N/C. What is the field strength if you triple your distance from the charge distribution?

\[ E = \frac{k \cdot q}{r^2} \Rightarrow E' = \frac{k \cdot q}{(3r)^2} = \frac{1}{9} \cdot \frac{k \cdot q}{r^2} = \frac{1}{9} E = 100 \text{ N/C} \]

Parts (b) and (c) refer to the following figure:

(b) A spherical surface surrounds an isolated positive charge, as shown. If a second charge is placed outside the surface (see figure), which of the following will be true of the total flux through the surface?

(i) Flux doesn’t change
(ii) Flux increases
(iii) Flux decreases.
(iv) Flux increases or decreases depending on the sign of the second charge.

(c) What is the impact of this second charge on the electric field at the point shown?

(i) Electric field doesn’t change
(ii) Electric field increases
(iii) Electric field decreases.
(iv) Electric field increases or decreases depending on the sign of the second charge.

\[ \vec{E}_{\text{total}} = \vec{E}_1 + \vec{E}_2 \]