

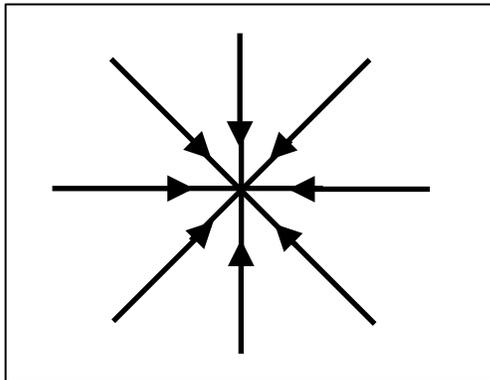
Field Line Diagrams

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Recall:

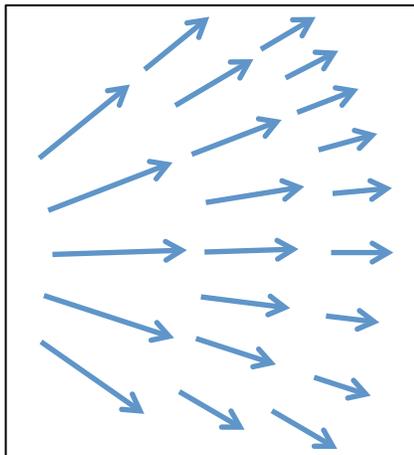
- 1) The electric field at a given location points in the direction of the electrostatic force that a **positive** charge **would** experience, if it were placed at that location.
- 2) In a **vector field diagram**:
 - a. there are many short arrows, one after the other;
 - b. the **length** of an arrow indicates its magnitude of the field at that location.
- 3) In a **field-line diagram**:
 - a. there are fewer arrows and arrows begins at a positive charge or ends at a negative charge—or both;
 - b. the **density** of arrows in a given area indicates the magnitude of the field in that location.

A. Convert the following field-line diagram into a vector field diagram:



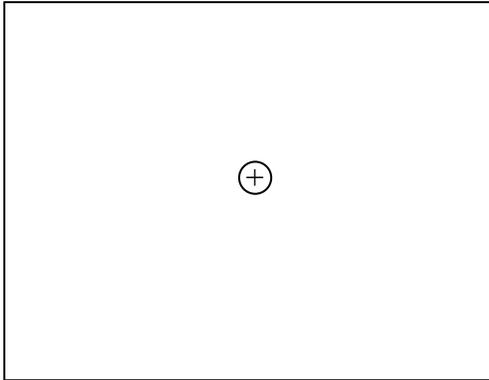
B. What kind of charge must be located at the center of this diagram? Explain.

C. Convert the following vector field diagram into a field-line diagram:

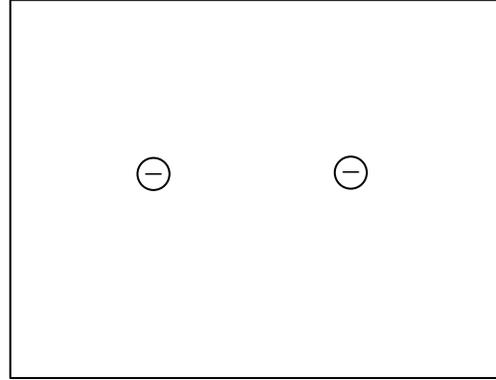


D. Draw field line diagrams for the following charge arrangements:

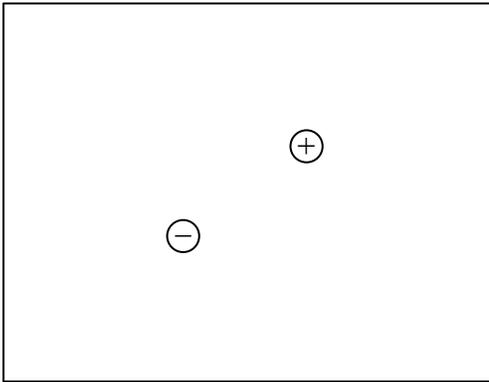
i.



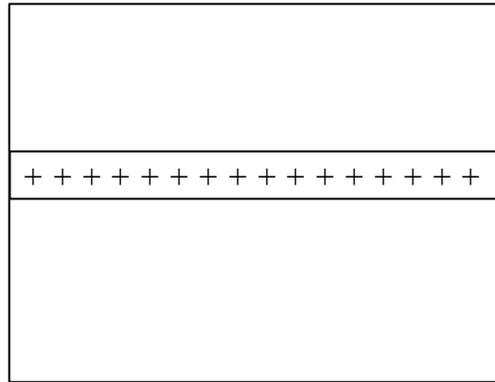
ii.



ii.



iii.



(a continuous line of positive charge.)

E. Consider the field-line diagram to the right, with points **a**, **b**, and **c**, labeled.

- i. What is the direction of the electric field at point **c**?
- ii. As you go from point **c** to point **b** to point **a**, what happens to the magnitude and direction of the electric field?
- iii. If a small negative point-charge were placed at point **a**, would it experience a net electrostatic force? If so, what direction would this force point in?
- iv. What are the signs of the two charges in the diagram (upper & lower)? Is the magnitude of the upper charge greater than, less than or approximately equal to the magnitude of the lower charge?

