August 27th

Chapter 22

Helproom Policies

- Helproom (PLC) is for collaborative learning
- TAs will sit at the tables and wear a badge with their name and course
- Computers are for entering answers
  - Not for reading email or browsing the web
  - Will be logged out automatically after 15 min
  - Computer use may be monitored
  - Printer is only for printing a copy of HW
- No food or drink is allowed in helproom!

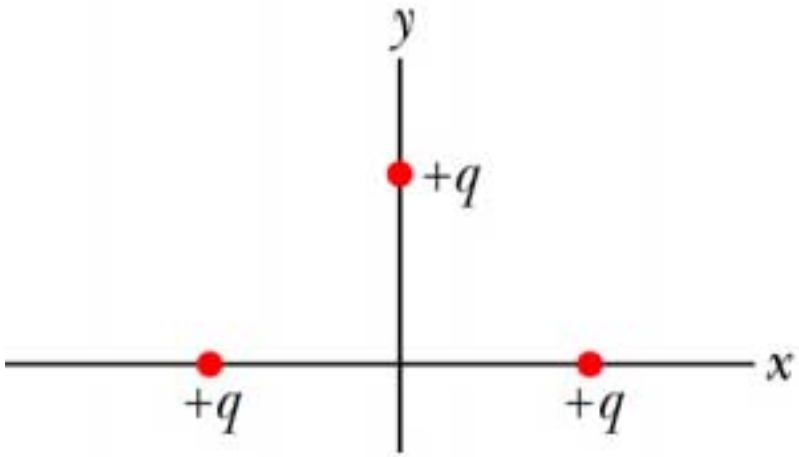
Electric Force

- The magnitude of the electrostatic force, *F*, between 2 charged particles with charges q_1 and q_2, respectively, and separated by a distance *r* is defined as

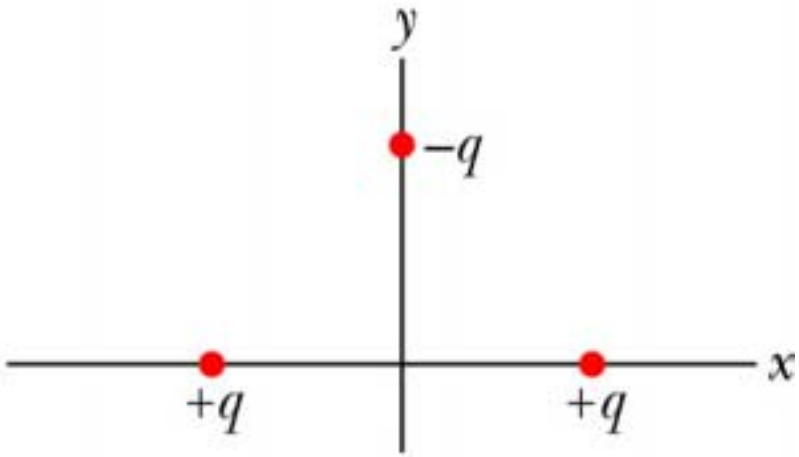
$$F = \frac{k|q_1||q_2|}{r^2}$$

- This is Coulomb's law where *k* is electrostatic constant

$$k = \frac{1}{4\pi\varepsilon_0} = 8.99 \times 10^9 \, N \cdot m^2 / C^2$$



(1)



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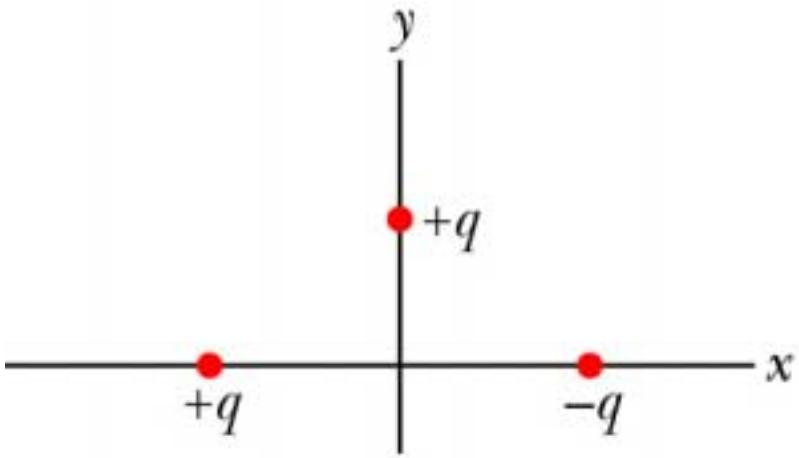

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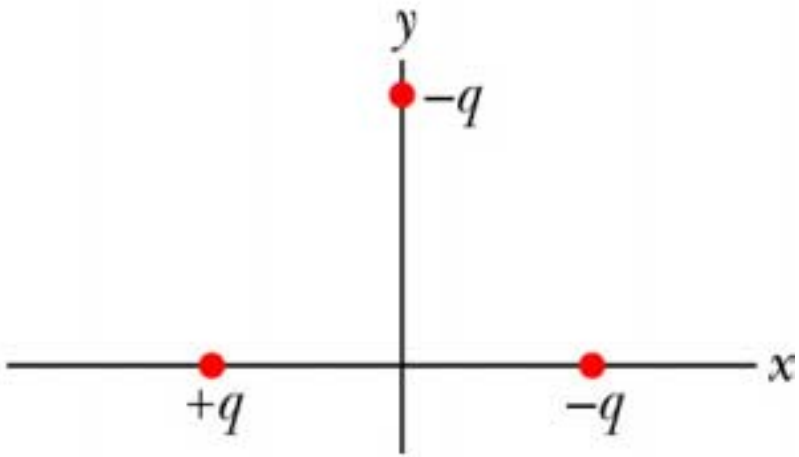


(4)

Coulomb's Law

- Does Coulomb's law hold for all charged objects?

NO

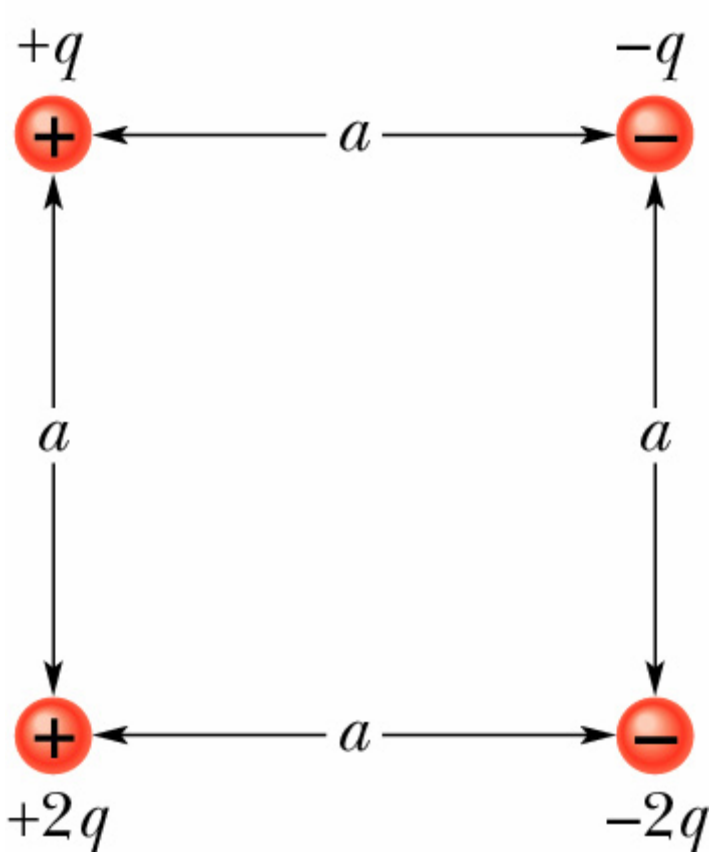
- Only for charged particles, charged particle-like objects and spherical shells (including solid spheres) of uniform charge

Electric Charge

- Shell theorems for electrostatics
  - A shell of uniform charge attracts or repels a charged particle that is outside the shell as if all the shell's charge were concentrated at its center
  - If a charged particle is located inside a shell of uniform charge, there is no net electrostatic force on the particle from the shell

Electric Charge

Demo of putting a container of styrofoam chips on top of the Van de Graaf. In a plastic container they become charged and fly out due to repulsive force. Inside a metal container there is no force and they do no fly out.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