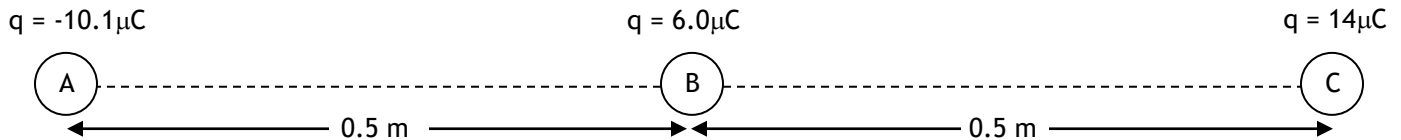


$$F_q = \frac{kq_1q_2}{d^2} \quad k = 9.0 \times 10^9 \frac{\text{Nm}^2}{\text{C}^2}$$

Recall that net force is a vector and both size and direction must be taken into account when adding multiple forces on an object. In the following problems, you will need to determine the net force on a single charge resulting from two other charges on a line.

- 1) Like charges \_\_\_\_\_.
- 2) Opposite charges \_\_\_\_\_.



- 3) Using the above diagram, label the electrostatic forces acting on charge B. Remember to show direction and show the relative size of the force with the length of the arrow. (Free body diagram)
- 4) Will these forces add to make a larger net force or subtract to make a smaller net force? ( add    subtract )
- 5) Calculate the electrostatic force from charge A acting on charge B.

force from A on B
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- 6) Calculate the electrostatic force from charge C acting on charge B.

force from C on B
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- 7) What is the size and direction of the net force acting on charge B?

net force on B
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Using the same diagram as above, repeat the same questions, this time looking at charge C.

- 8) Draw a free body diagram for charge C.
- 9) Will these forces add to make a larger net force or subtract to make a smaller net force? ( add    subtract )
- 10) Calculate the electrostatic force from charge A acting on charge B.

force from B on A
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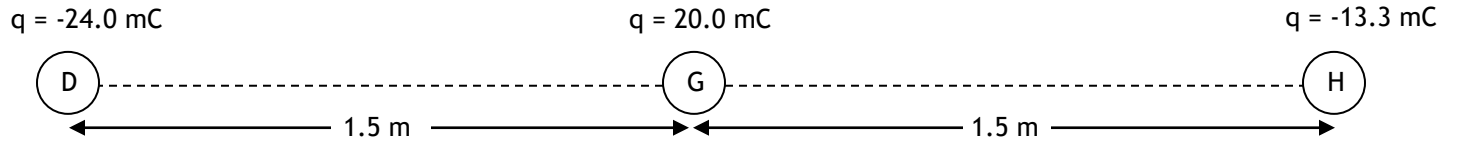
- 11) Calculate the electrostatic force from charge C acting on charge B.

force from B on C
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- 12) What is the size and direction of the net force acting on charge C?

net force on C
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Here are two similar problems involving a line of charges. Apply the same concepts and equations that you did in the first problem.

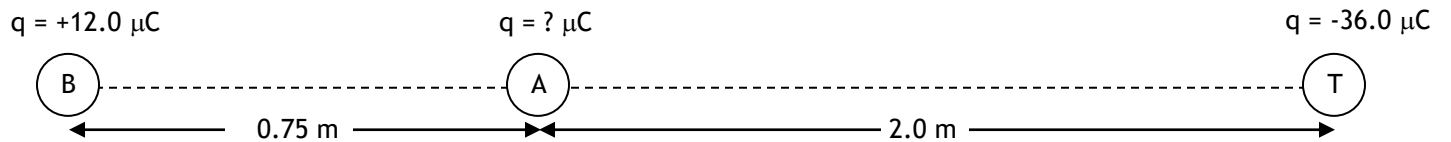


13) What is the net force (size and direction) on charge G?

net force on G

14) What is the net force (size and direction) on charge D?

net force on D



15) If the NET FORCE acting on charge A is  $8.6 \text{ N}$  to the right, what must be charge on charge A?

charge of charge A