

COULOMB'S LAW – 3 POINT CHARGES

Example 1

Three-point charges are in a straight line as shown below. All three points have a charge of 2.5×10^{-5} C, but point q1 and q2 are negative and q3 is positive.

q1 and q2 are separated by a distance of 0.5 m. q2 and q3 are separated by a distance of 0.25 m.



1. Label the diagram: positives, negatives, distances, attracting, and repelling.
2. What direction is the net force on q2? Why?

Example 2

q1 has a charge of -2×10^{-3} C, q2 has a charge of 2×10^{-3} C, and q3 has a charge of -4.3×10^{-3} C.

q1 and q2, and q2 and q3 are each separated by a distance of 0.3 m.



1. Label the diagram: positives, negatives, distances, attracting, and repelling.
2. What direction is the net force on q2? Why?

Example 3

q1 and q2 are separated by a distance of 0.35 m. q2 and q3 are separated by a distance of 0.5 m.

q1 has a charge of 3.0×10^{-6} C, q2 has a charge of -3.5×10^{-6} C, and q3 has a charge of -4.2×10^{-6} C.

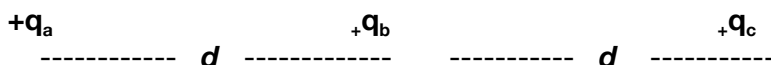


Calculate the net force acting on q1.

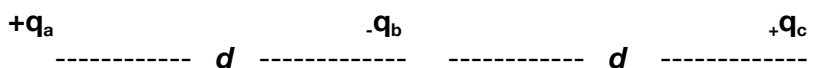
- 1) Label the diagram: positives, negatives, distances, attracting, and repelling.
- 2) Calculate the force between q1 and q2
- 3) Determine the direction that q1 will move because q2
- 4) Calculate the force between q1 and q3
- 5) Determine the direction that q1 will move because of q3.
- 6) Calculate the net force on q1 using the equation $F_{\text{net}} = F_1 + F_2$. You must include the direction as (+) and/or (-).

Practice

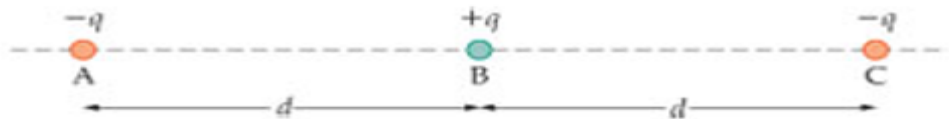
1. Three identical charged particles are aligned along the x-axis with an equal distance “d” apart, as shown in the diagram. Find the **direction** of the Net Force on **Particle B**.



2. Three identical charged particles A, B, and C are aligned along the x-axis with an equal distance “ d ” apart, as shown in the diagram. They have the same size of charges, but particle A is positive, particle B is negative and particle C is positive. Find the direction of the Net Force on **Particle C**.



3. Rank the strength of electrical force on particle A, B and C .



4. Three-point charges are aligned on the horizontal axis as shown below.
 q_1 and q_2 are separated by a distance of 0.35 m. q_2 and q_3 are separated by a distance of 0.5 m.
 q_1 has a charge of 3.2×10^{-7} C, q_2 has a charge of -2.5×10^{-7} C, and q_3 has a charge of -4.1×10^{-7} C.

q1

q2

q3

Calculate the net force acting on q2.

- Label the diagram: positives, negatives, distances, attracting, and repelling.
- Calculate the force between q_1 and q_2 .

- Determine the direction that q_2 will move because q_1 .

- Calculate the force between q_2 and q_3 .

- Determine the direction that q_2 will move because of q_3 .

- Calculate the net force on q_2 using the equation $F_{\text{net}} = F_1 + F_2$. You must include the direction as (+) and/or (-).

Calculate the net force on q3.

- You already calculated the magnitude of the forces acting on q_3 . Calculate the force of q_1 on q_3 .

- Determine the direction that q_3 will move because of q_1 .

- Determine the direction that q_3 will move because of q_2 .

- Calculate the net force on q_3 using the equation $F_{\text{net}} = F_1 + F_2$. You must include the direction as (+) and/or (-).