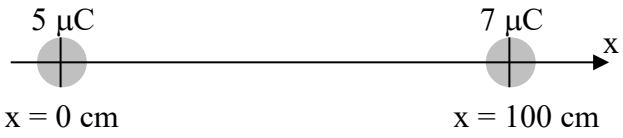
Physics Booklet 15

Flipped Classroom:
Find the equilibrium of Q3 placing it on a line consist of two charges, Q1 and Q2.
Tutorial: https://youtu.be/CPjdwixY9Qk

Do Now:
Two static charges are placed a distance 1 m apart. One has a charge of 5 μC (q1) , and the other has a charge of 7 μC (q2) . A charge placed anywhere near the two charges will feel the electrostatic force due to both of them.



Question 1: A static charge that feels no net force is said to be in equilibrium. Can you place a third charge q = 1 μC (q3) somewhere on the x-axis so that it feels no net force due to the other two? If so, in which region: somewhere to the left of the two charges, somewhere in the middle, or somewhere to the right of the two charges?

Question 2: What would happen if you instead placed a charge of –1 μC (q3) in that spot? Would it be in equilibrium or not?

Tutorial: https://youtu.be/OXpCCd1gLJE

Big Idea :
Question 3: Calculate where to place the charge q from part 1 so that it feels no net force.

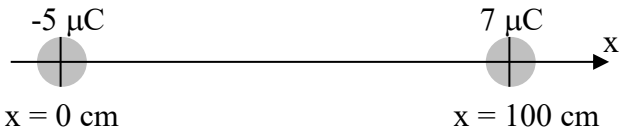
Question 4: Use Coulomb's Law to prove the answer to question 3

Tutorial: https://youtu.be/eiIZ6EpkE_A

Exit Slip :
What happens to the charge q from Do Now if you place it between Q1 and Q3? Does the charge try to return to the equilibrium point or not? (Hint: consider both a positive and a negative q.)

Tutorial: https://youtu.be/pyhhZ_BT1AY

Homework:
One of the charges is now replaced with a negative charge. (See the picture.)



Could you now place a charge of q = 1 μC somewhere on the x-axis so that it feels no net force? If so, in which region: somewhere to the left of the two charges, somewhere in the middle, or somewhere to the right of the two charges?

Tutorial : https://youtu.be/bCb6ZYS8j3Q