Tutorial Sheets 1

Electric Force and Coulomb's Law

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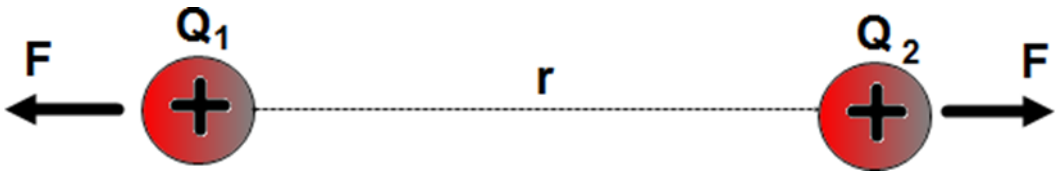
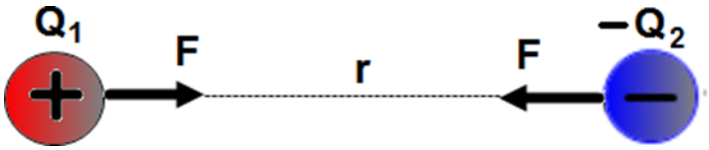
1. Two positive charges Q1 and Q2 are separated by a distance r. The charges repel each other with a force F. **If the magnitude of each charge is doubled** and the distance stays unchanged what is the new force between the charges?

A. F **B. 2 F** **C. 4 F** **D. 1/ 4 F** **E. 1/ 2 F**



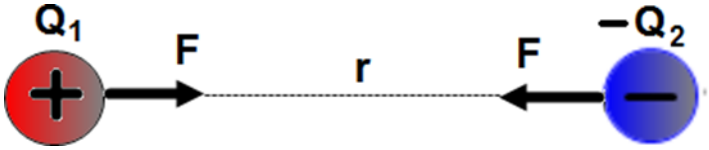
2. Two positive charges Q1 and Q2 are separated by a distance r. The charges repel each other with a force F**. If the distance between the charges is cut to one-fourth** what is the new force acting on each charge?

A. 16 F **B. 2 F** **C. 4 F** **D. 1/ 4 F** **E. 1 /2 F**



3. Two charges **Q1 and –Q2** are separated by a distance r. The charges attract each other with a force F. What is the new force between the charges if the distance is tripled?

A. 16 F **B. 2 F** **C. 4 F** **D. 1/ 4 F** **E. 1 /9 F**

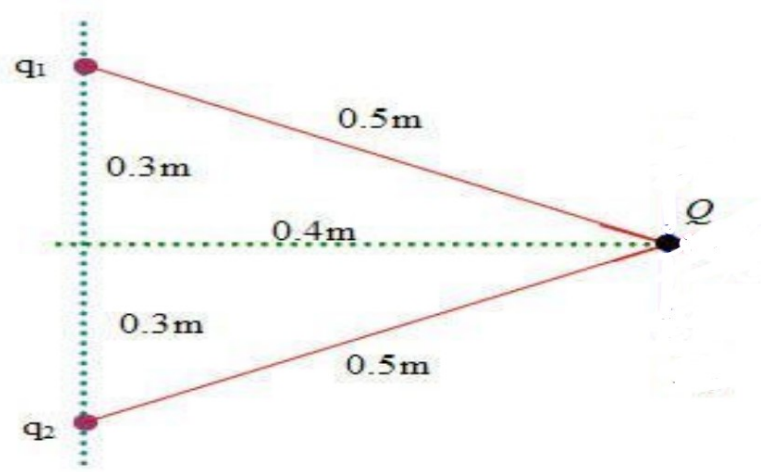


4. Two charges Q1 and –Q2 are separated by a distance r. The charges attract each other with a force F. What is the new force between the charges if the distance is cut to one-fourth and the magnitude of each charge is doubled?

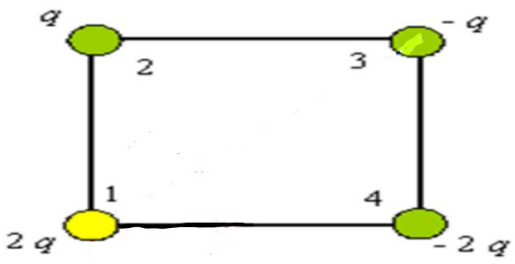
A. 16 F **B. 64 F** **C. 48 F** **D.48** **E.1/64F**

5. What must be the distance between point charge **q1=26.0μC** and point charge **q2=−47.0μC** for the electrostatic force between them to have a magnitude of **5.70N**?

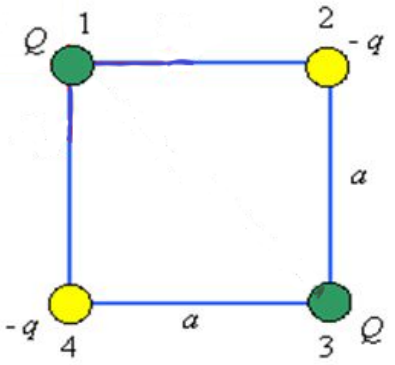
6. **In figure 1, two equal positive charges $q=2\times10^{-6}$C interact with a third charge $Q=4\times10^{-6}$C. Find the magnitude and direction of the resultant force on Q.**



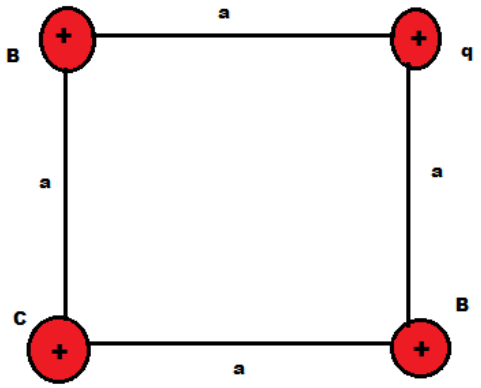
7. **In figure 2 what is the resultant force on the charge in the lower left corner of the square? Assume that $q=1\times10^{-7}$ C and a = 5cm**



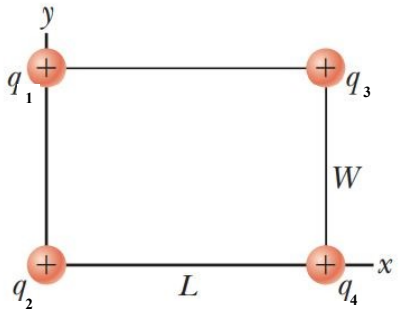
8. **A charge** Q is fixed at each of two opposite corners of a square as shown in figure below. A charge q is placed at each of the other two corners. (a) If the resultant electrical force on Q is Zero, how are Q and q related.



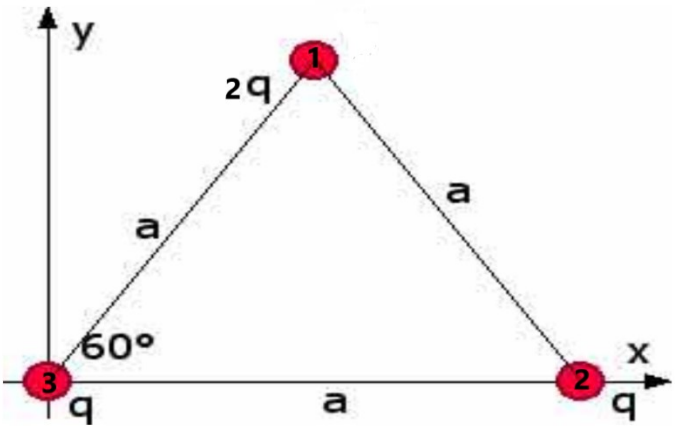
9. Four-point charges are at the corners of a square of side a as shown in the figure below. Determine the magnitude and direction of the resultant electric force on q, with ke, q, and a left in symbolic form. (B=4q , C=6.5q) left the x axis pointing to the right.



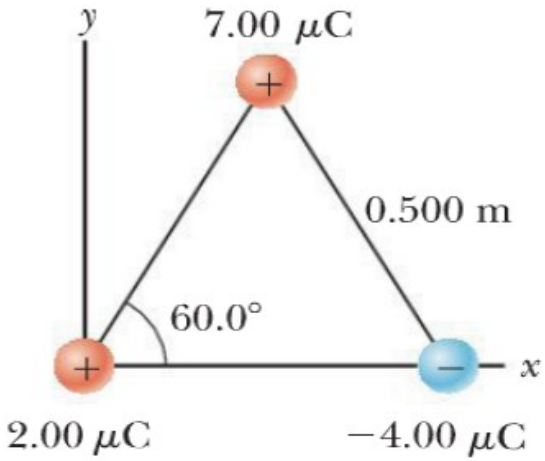
10. **Four** identical charged particles $q=+32\times10^{-6}$ are located on the corners of a rectangle as shown in Figure. The dimensions of the rectangle are L=3m and W= 2 m . **Calculate** (a) the magnitude and (b) the direction of the total electric force exerted on the charge 4.



11. **Three-point charges** are located at the corners of an equilateral triangle as in the figure below. Find the magnitude and direction of the net electric force on the q1.



12. Find the magnitude and direction of the electric field at the position of the 2.00 μc charge.



13. The force acting between two-point charges kept at a certain distance is 5N. Now the magnitudes of charges are doubled and distance between them is halved, the force acting between them is _____ N.

A. 5 **B. 20** **C. 40** **D.80**

14. The force between two charges 2μC and 4μC is 24N, when they are separated by a certain distance in free space. The forces if, (a) distance between them is doubled and (b) distance is halved are :

A. 16 N , 80N **B. 8 N , 72N** **C. 6 N , 96N** **D. 10 N , 68N**

15. Two uniformly charged spheres with radii r1 & r2 and charges Q1 & Q2 are separated by distance d (from the periphery of the two spheres). What is the magnitude of force on Q2 due to Q1?