Coulomb's law worksheet

1. Find the electrostatic force between charges of +2.0 C and +5.0 C separated by a distance of 75 m in a vacuum.

2. A negative charge of - 4.0 x 10^{-5} C and a positive charge of 7.0 x 10^{-5}C are separated by 0.15 m. What is the force between the two charges?

3. Calculate the force between charges of 5.0x10^{-8} C and 1.0x10^{-7} C if they are 2.0 cm apart.

4. Two negative charges that are both - 3.0 C push each other apart with a force of 19.2 N. How far apart are the two charges?

5. Two charges of +8.0 mC and -6.0 mC attract each other with a force of 3.0 x 10^3 N in a vacuum. What is the distance between the charges?

6. Two equal charges of 1.1x10^{-7} C experience an electrostatic force of 4.2x10^{-4} N. How far apart are the centers of the two charges?

7. A negative charge of - 0.0005 C exerts an attractive force of 9.0 N on a second charge that is 10 m away. What is the magnitude of the second charge?

8. A negative charge of - 8.0 x 10^{-6} C exerts an attractive force of 12 N on a second charge that is 0.050 m away. What is the magnitude of the second charge?

9. Two charged spheres, Q and 2Q, placed 4.0 cm apart, are attracted to each other with a force of 1.2x10^{-9} N. Calculate the magnitude of the charge on each sphere.

10. Two small charged spheres have their centres 0.05 m apart and repel each other with a force of 5 x 10^{-5} N. What would be the force of repulsion if the spheres were 0.10 m apart?

11. What happens to the force between two charged metal spheres in a vacuum if the charge on each is doubled and the distance between them is multiplied by three?

12. Two charged spheres 10 cm apart are attracted to each other with an electrical force of 3.0x10^{-6} N. What happens to the force between the spheres if

(a) one of the charges is halved.

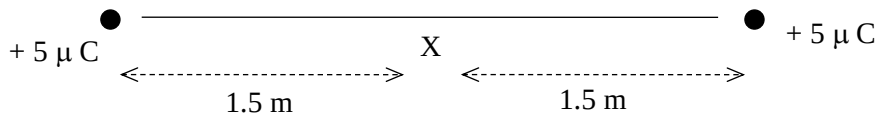
(b) the separation is decreased to 5 cm

13. Two equal charges *+q* are at the distance *r*. Distance between them decreased twice. What change must be done to one of them to keep repulsive force the same? Show your working.

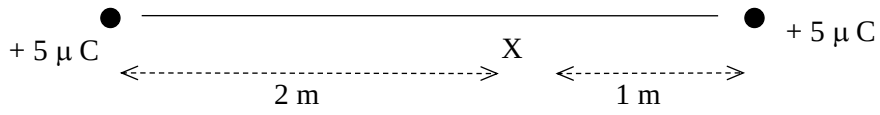
14. Two small objects with charges q=$8 \times 10^{-6} C$ and $2 \times 10^{-6}\ C$ were briefly contacted each other and placed at the distance *r=0.8 m*. What force will be acting between them?

15. Find the magnitude and direction of the force on a charge of +10 μC placed at X in each of the following:

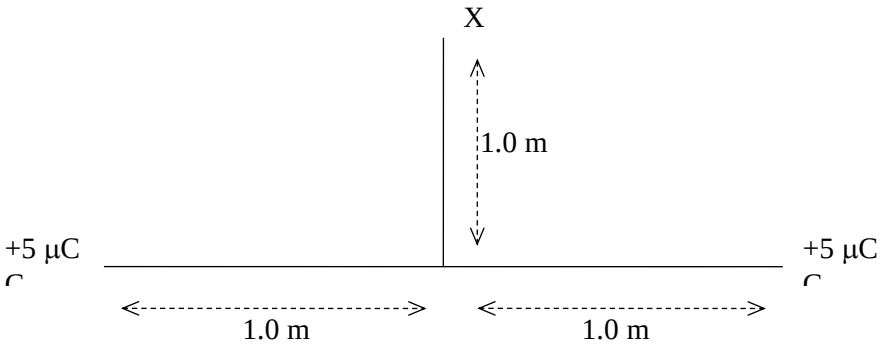
(a)



(b)



(c)



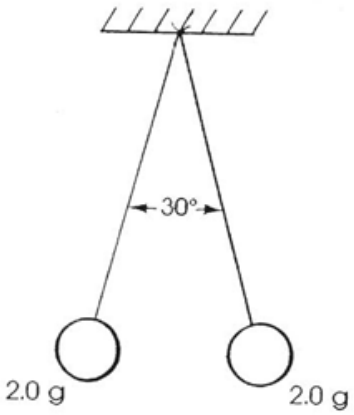
16. Three objects of charge -4.0x10^{-6} C, -6.0x10^{-6} C and +9.0x10^{-6} C are placed in a line spaced equally with a distance 0.50 m between them. Calculate the magnitude and direction of the net force acting on each charge.

17. Two small spheres with charges 1.6x10^{-5} C and 6.4x10^{-5} C are 2.0 m apart. Where, on the line joining the spheres, should a third charged sphere of charge -3.0x10^{-6} C be placed such that it experiences no net electrical force?

18. Three negatively charged spheres, each with a charge of -4.0x10^{-5} C, are fixed at the vertices of an equilateral triangle whose sides are 20.0 cm long. Calculate the magnitude and direction of the net electric force on each sphere.

19. A metal sphere of mass 6.0 x 10^{-3} kg is found to just float in air above a similar metal sphere when both have a charge of 4.0 mC. Assuming that the only upwards force is electrostatic repulsion, find the distance between the spheres.

20. Two identical, small spheres of mass 2.0 g are fastened to the ends of a 0.60 m long fishing line of negligible mass. The fishing line is suspended by a hook in the ceiling at its exact center. When the spheres are each given an identical electric charge, they separate as shown:



Calculate the magnitude of the charge on each sphere.