

Worksheet

Coulomb's Law of Electric Forces

1. The electric force between two charged objects is 0.10 N. What will be the new force if the charge on one of the objects is made four times larger?
2. What will happen to the electric force between two charged objects if one charge is increased by a factor of two and the other is increased by a factor of four?
3. The electric force between two charged objects is 0.12 N. What will be the new electric force if the charge on one object is made twice as large, while the charge on the other is made three times smaller?
4. The electric force between two charged objects is 0.18 N. What will be the new electric force if the objects are moved three times further apart?
5. The electric force is 2.0×10^{-3} N when two charged objects are 1.0 m apart. What will be the new electric force if the charged objects are moved to positions that are 0.5 m apart?
6. The electric force between two charged objects is 0.24 N. What will be the new electric force if the charge on one object is made three times larger, the other is made four times smaller and the distance is decreased by a factor of two?
7. The electric force between two charged objects is 0.16 N. What will be the new electric force if the objects are moved four time further apart?
8. The electric force is 9.0×10^{-3} N when two charged objects are 0.2 m apart. What will be the new electric force if the charged objects are moved to positions that are 0.6 m apart?
9. The electric force between two charged objects is 0.32 N. What will be the new electric force is one charge is made two times larger, the other is made three times smaller, and the distance is decreased by a factor of six?
10. By what factor will the electric force between two charged objects change if one charge is tripled, the other is made six times larger, and the distance is decreased by a factor of three?
11. Calculate the force between charges of 5.0×10^{-8} C and 1.0×10^{-7} C if they are 5.0 cm apart?
12. What is the magnitude of the force a $1.5 \mu\text{C}$ charge exerts on a 3.2×10^{-4} C located 1.5 m away?

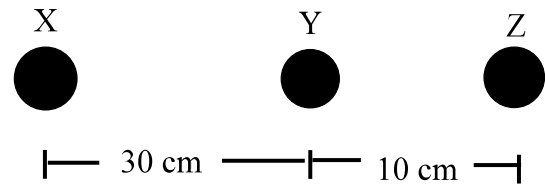
13. Two charged spheres, 4.0 cm apart, attract each other with a force of 1.2×10^{-9} N. Determine the magnitude of the charge on each, if one has twice the charge (of the opposite sign) as the other.
14. Two equal charges of magnitude 1.1×10^{-7} C experience an electrostatic force of 4.2×10^{-4} N. How far apart are the centres of the two charges?
15. Calculate the electric force between two charged spheres, each with a charge of -3.0×10^{-7} C, whose centers are separated by a distance of 2 mm.
16. Find the electric force between two electrons that are 3.0×10^{-5} m apart. Charge on an electron is -1.602×10^{-19} C.

17. What charge must be used to obtain the following electrostatic forces at the given distances?

- (a) 3.0 N repulsive force at 0.50 m from a $6.0 \mu\text{C}$ charge.
 (b) 60 N attractive force at 0.20 m from a $-10.0 \mu\text{C}$ charge.

18. Three charges X, Y, and Z lie on a straight line. Charge X is 30.0 cm to the left of charge Y and charge Z is 10.0 cm to the right of charge Y.

$Q_X = -5.0 \mu\text{C}$, $Q_Y = -3.0 \mu\text{C}$, and $Q_Z = -2.0 \mu\text{C}$.



- (a) Determine the net force on X due to Y and Z.
 (b) Determine the net force on Y due to X and Z.
 (c) Determine the net force on Z due to X and Y.

19. Three charge spheres are set on corners of a right-angled triangle as shown. What is the net force on A due to the presence of B and C?

$Q_A = -4.0 \mu\text{C}$, $Q_B = 5.0 \mu\text{C}$, $Q_C = 3.0 \mu\text{C}$, $d_{BA} = 20.0 \text{ cm}$, and $d_{CA} = 15.0 \text{ cm}$

