Coulomb's worksheet (use sig figs)

1. What is the electrical force acting on two substances if the charge for each is 4.0×10^{-7} C and they are placed 2.0 cm apart?

$$\frac{9\times10^{9} \times 4.0\times10^{-7}\times 4.0\times10^{-7}}{.020^{2}} = 3.6\,N$$

2. What is the electrical force acting on two substances if the charge for each is 5.0×10^{-8} C and they are placed 1.50 cm apart?

$$\frac{9\times10^{9} \times 5.0\times10^{-8}\times 5.0\times10^{-8}}{.0150^{2}} = 0.10\,N$$

3. The electrical force acting on 2 spheres with a charge of 5.67×10^{-4} C is 6.60×10^{6} N. What is the distance of the two spheres?

$$(6.60\times10^{6}) = \frac{9\times10^{9} \times 5.67\times10^{-4}\times 5.67\times10^{-4}}{r^{2}}$$

$0.0209\ m$ or $2.09\times10^{-2}\ m$

4. The electrical force acting on 2 spheres with a charge of 7.6×10^{-4}C is 5×10^{3} N. What is the distance of the two spheres?

$$(5\times10^{3}) = \frac{9\times10^{9} \times 7.6\times10^{-4}\times 7.6\times10^{-4}}{r^{2}}$$

$1\,m$

5. The charge of a sphere is 5.5×10^{-4}C. The electrical force of the 2 spheres is 7.00×10^{3}N. The distance between the 2 spheres is 6.0 cm. What is the charge of the other sphere?

$$7.00\times10^{3} = \frac{(9\times10^{9} \times 5.5\times10^{-4}\times q_2)}{.060^{2}}$$

$0.0000051\,C$ or $5.1\times10^{-6}\,C$

6. The charge of a sphere is 9.555×10^{-5}C. The electrical force of the 2 spheres is 9.00×10^{3}N. The distance between the 2 spheres is 9.5 m. What is the charge of the other sphere?

$$9.00\times10^{3} = \frac{(9\times10^{9} \times 9.555\times10^{-5} \times q_2)}{9.5^{2}} = 0.94\text{C} \text{ or } 9.4\times10^{-1}\text{C}$$

7. What is the electrical force acting on two substances if the charge for each is 5.55×10^{-7} C and is placed 2.00 cm apart?

$$Fe = \frac{5.55\times10^{-7} \times 5.55\times10^{-7} \times 9\times10^{9}}{0.0200^{2}} = 6.93\text{N}$$

8. The electrical force acting on 2 spheres with a charge of 4.7×10^{-5}C is 3.60×10^{4}N. What is the distance of the two spheres?

$$(3.60\times10^{4}) = \frac{9\times10^{9} \times 4.7\times10^{-5} \times 4.7\times10^{-5}}{r^{2}}$$

0.024m

9. The charge of a sphere is 9.5×10^{-4} C. The electrical force of the 2 spheres is 8.00×10^{3} N. The distance between the 2 spheres is 8.00 cm. What is the charge of the other sphere?

$$8.00\times10^{3} = \frac{(9\times10^{9} \times 9.5\times10^{-4} \times q_2)}{.0800^{2}} = 6.0\times10^{-6}\text{C}$$

10. The charge of a sphere is 9.55×10^{-8}C. The electrical force of the 2 spheres is 9.00×10^{6} N. The distance between the 2 spheres is 9.0 m. What is the charge of the other sphere?

$$9.00\times10^{6} = \frac{(9\times10^{9} \times 9.55\times10^{-8} \times q_2)}{9.0^{2}} = 8.5\times10^{5}\text{C} \text{ or } 850000\text{C}$$

11. The charge of a sphere is 5.55×10^{-5}C. The electrical force of the 2 spheres is 4.5×10^{3}N. The distance between the 2 spheres is 9.5 m. What is the charge of the other sphere?

$4.5\times10^{3} = \frac{(9\times10^{9} \times 5.55\times10^{-5} \times ?)}{9.5^{2}}$ = .81C or 8.1×10^{-1}C

12. The electrical force acting on 2 spheres with a charge of 6.76×10^{-5} C is 3.60×10^{5}N. What is the distance of the two spheres?

$(3.60\times10^{5}) = \frac{9\times10^{9} \times 6.76\times10^{-5} \times 6.76\times10^{-5}}{?^{2}}$ 0.0107 m = 1.07×10^{-2} m

13. The charge of a sphere is 2.5×10^{-4} C. The electrical force of the 2 spheres is 3.00×10^{3} N. The distance between the 2 spheres is 8.05 cm. What is the charge of the other sphere?

$3.00\times10^{3} = \frac{(9\times10^{9} \times 2.5\times10^{-4} \times C?)}{.0805^{2}}$ = 0.0000086C or 8.6×10^{-6}C

14. The electrical force acting on 2 spheres with a charge of 6×10^{-4} C is 6×10^{5}N. What is the distance of the two spheres?

$(6\times10^{5}) = \frac{9\times10^{9} \times 6\times10^{-4} \times 6\times10^{-4}}{?\ r^{2}}$ = 0.07m or 7×10^{-2}m

15. The charge of a sphere is 5.5×10^{-2}C. The electrical force of the 2 spheres is 6.00×10^{6} N. The distance between the 2 spheres is 7.0 m. What is the charge of the other sphere?

$6.00\times10^{6} = \frac{(9\times10^{9} \times 5.5\times10^{-2} \times C?)}{7.0^{2}}$ = 0.59C or 5.9×10^{-1}C