

Physics 227H, Fall 2020: Problems for Recitation 1


•5 A particle of charge $+3.00 \times 10^{-6} \text{ C}$ is 12.0 cm distant from a second particle of charge $-1.50 \times 10^{-6} \text{ C}$. Calculate the magnitude of the electrostatic force between the particles.

••7 In Fig. 21-22, three charged particles lie on an x axis. Particles 1 and 2 are fixed in place. Particle 3 is free to move, but the net



Fig. 21-22 Problems 7 and 40.

electrostatic force on it from particles 1 and 2 happens to be zero. If $L_{23} = L_{12}$, what is the ratio q_1/q_2 ?

••13  In Fig. 21-25, particle 1 of charge $+1.0 \mu\text{C}$ and particle 2 of charge $-3.0 \mu\text{C}$ are held at separation $L = 10.0 \text{ cm}$ on an x axis. If particle 3 of unknown charge q_3 is to be located such that the net electrostatic force on it from particles 1 and 2 is zero, what must be the (a) x and (b) y coordinates of particle 3?

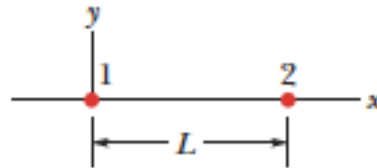



Fig. 21-25 Problems 13, 19, 30, 58, and 67.

••10  In Fig. 21-24, four particles form a square. The charges are $q_1 = q_4 = Q$ and $q_2 = q_3 = q$. (a) What is Q/q if the net electrostatic force on particles 1 and 4 is zero? (b) Is there any value of q that makes the net electrostatic force on each of the four particles zero? Explain.

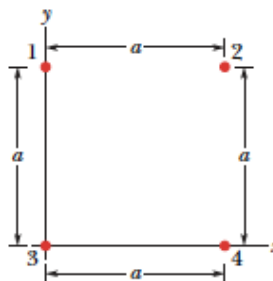


Fig. 21-24 Problems 10, 11, and 70.

61 Three charged particles form a triangle: particle 1 with charge $Q_1 = 80.0 \text{ nC}$ is at xy coordinates $(0, 3.00 \text{ mm})$, particle 2 with charge Q_2 is at $(0, -3.00 \text{ mm})$, and particle 3 with charge $q = 18.0 \text{ nC}$ is at $(4.00 \text{ mm}, 0)$. In unit-vector notation, what is the electrostatic force on particle 3 due to the other two particles if Q_2 is equal to (a) 80.0 nC and (b) -80.0 nC ?

62 **SSM** In Fig. 21-43, what are the (a) magnitude and (b) direction of the net electrostatic force on particle 4 due to the other three particles? All four particles are fixed in the xy plane, and $q_1 = -3.20 \times 10^{-19} \text{ C}$, $q_2 = +3.20 \times 10^{-19} \text{ C}$, $q_3 = +6.40 \times 10^{-19} \text{ C}$, $q_4 = +3.20 \times 10^{-19} \text{ C}$, $\theta_1 = 35.0^\circ$, $d_1 = 3.00 \text{ cm}$, and $d_2 = d_3 = 2.00 \text{ cm}$.

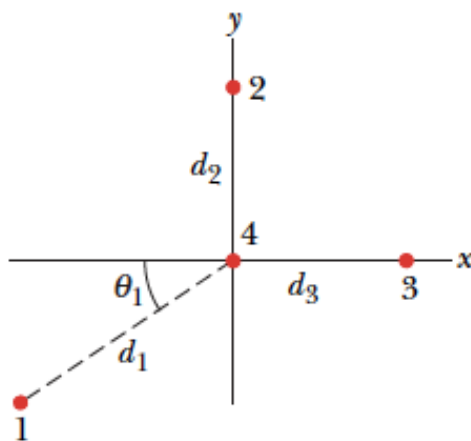


Fig. 21-43 Problem 62.