

50. Regarding the forces on q_3 exerted by q_1 and q_2 , one must “push” and the other must “pull” in order that the net force is zero; hence, q_1 and q_2 have opposite signs. For individual forces to cancel, their magnitudes must be equal:

$$k \frac{|q_1| |q_3|}{(3d)^2} = k \frac{|q_2| |q_3|}{(2d)^2}$$

which simplifies to

$$\frac{|q_1|}{9} = \frac{|q_2|}{4} \quad .$$

Therefore, $q_1 = -\frac{9}{4}q_2$.