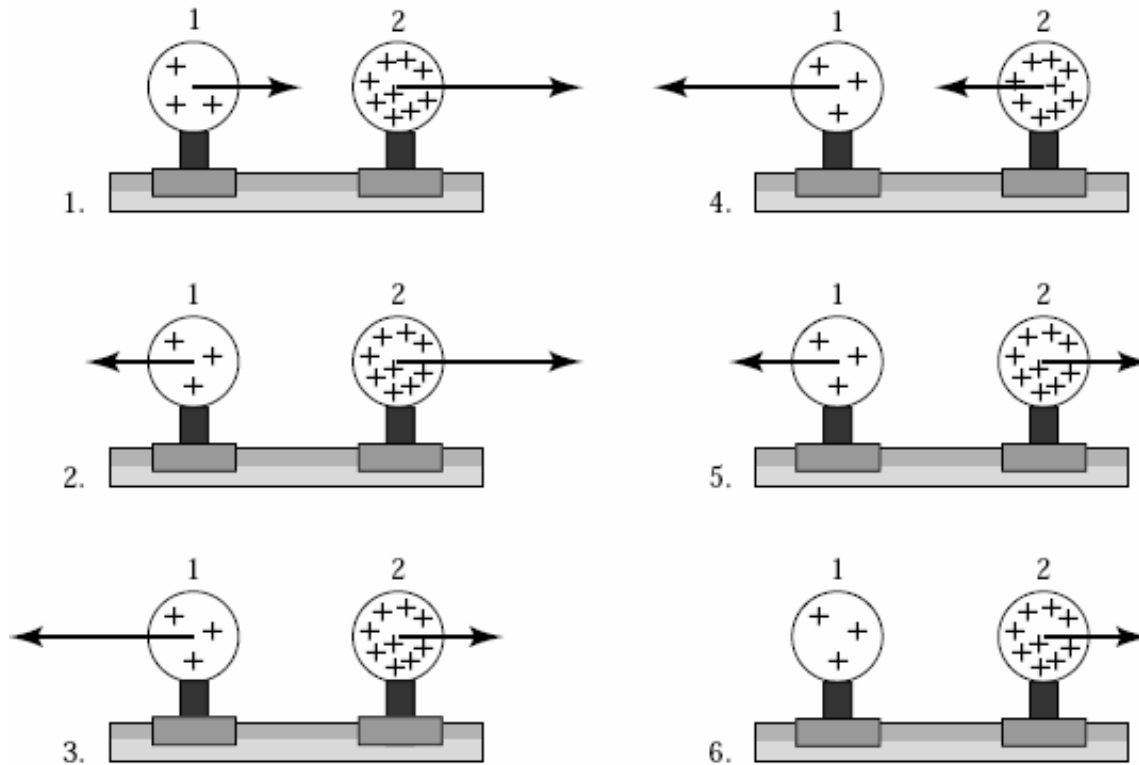


Two uniformly charged spheres are firmly fastened to and electrically insulated from frictionless pucks on an air table. The charge on sphere 2 is three times the charge on sphere 1. Which force diagram correctly shows the magnitude and direction of the electrostatic forces:

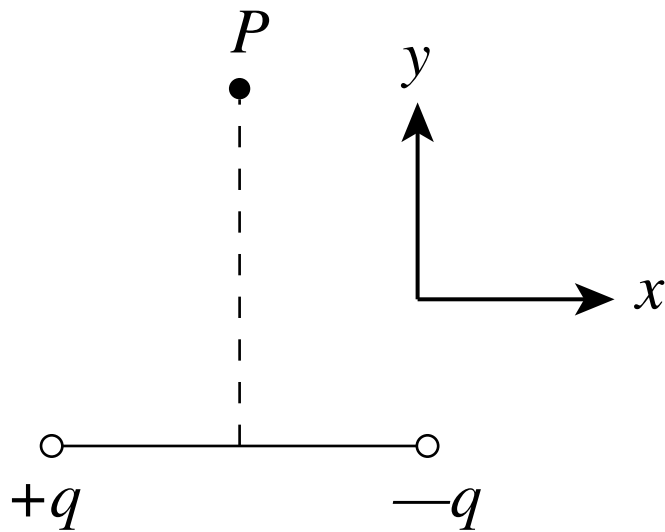


7. none of the above

A hydrogen atom is composed of a nucleus containing a single proton, about which a single electron orbits. The electric force between the two particles is 2.3×10^{39} greater than the gravitational force! If we can adjust the distance between the two particles, can we find a separation at which the electric and gravitational forces are equal?

1. Yes, we must move the particles farther apart.
2. Yes, we must move the particles closer together.
3. No, at any distance

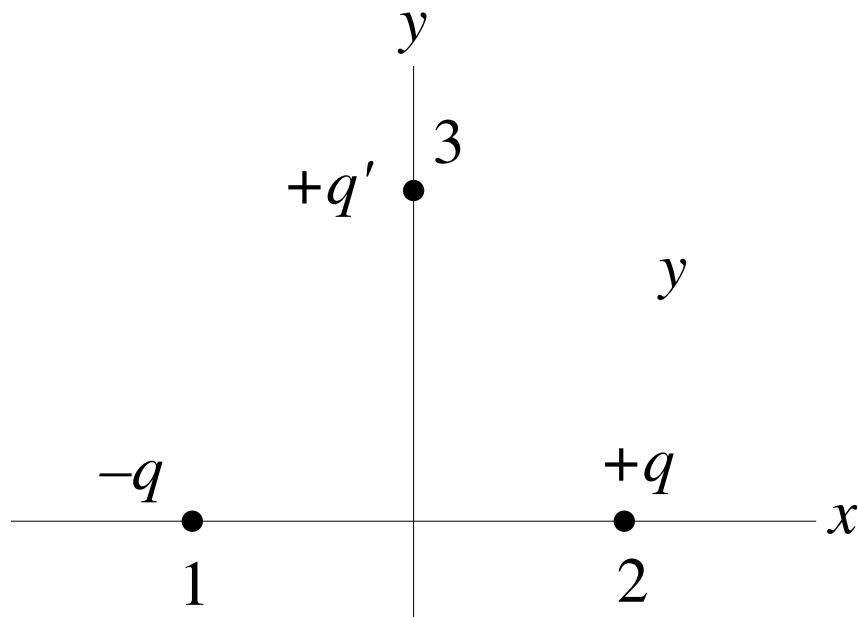
A dipole is placed as illustrated.



The electric field at point P is

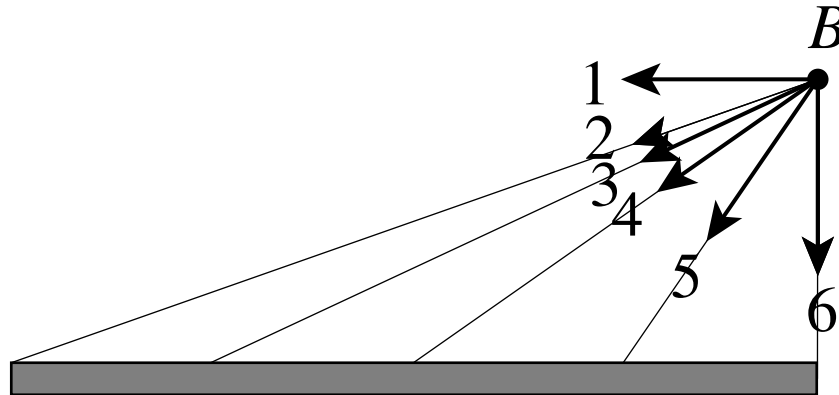
1. along $+x$.
2. along $-x$.
3. along $+y$.
4. along $-y$.
5. in another direction.
6. The electric field at P is zero.

A positively charged particle is placed along the positive x axis and a particle carrying a negative charge of equal magnitude is placed at equal distance from the origin along the negative x axis. A third particle carrying a positive charge is placed on the y axis. The vector sum of the forces exerted by 1 and 2 on 3 is directed



1. in the $+x$ direction.
2. in the $-x$ direction.
3. along the y axis.
4. toward particle 1.
5. along another direction.

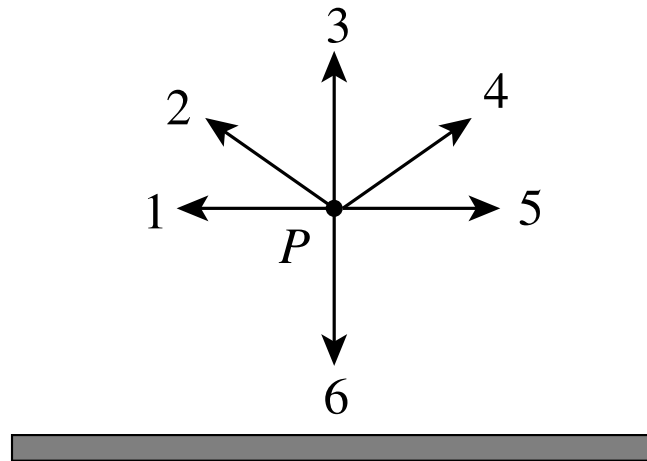
Consider a short rod carrying a uniformly distributed negative charge.



Which vector most closely represents the direction of the electric field at point B ?

1. Vector 1.
2. Vector 2.
3. Vector 3.
4. Vector 4.
5. Vector 5.
6. Vector 6.
7. The answer depends on the sign of the charge on the 'test' particle

Consider a short rod carrying a uniformly distributed positive charge.



Which vector most closely represents the direction of the electric field at point P ?

1. Vector 1.
2. Vector 2.
3. Vector 3.
4. Vector 4.
5. Vector 5.
6. Vector 6.
7. The answer depends on the sign of the charge on the 'test' particle

Does a neutral object have an electric field?
(Consider points outside the object.)

1. Yes.
2. No.
3. It depends.