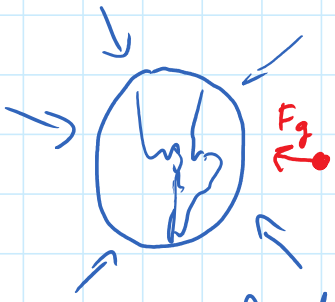
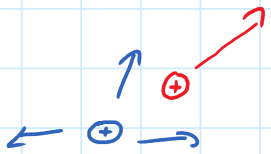
# Electrostatic Force - Coulombs Law

Thursday, May 3, 2018 12:50 PM




grav field

$F_g = \frac{GM}{r^2} m$



Coulomb Law: Can be attractive or repulsive depending on charge

$F_e = \frac{kQ_1Q_2}{r^2}$

$E = \frac{F_e}{Q_2}$

$F_e = E \cdot Q_2$

vector, mag, dir

units – Newtons.

Ex $+3\mu C$ ⊕ ——— 4m ——— $-2\mu C$ ⊖ Find $F_e$ between them

$$F_e = \frac{kQ_1Q_2}{r^2} = \frac{(9\times10^9 \ N\cdot m^2/C^2)(3\times10^{-6} C)(2\times10^{-6} C)}{(4 m)^2}$$

$$= 3.4\times10^{-3} N \ (\text{attract})$$

Ex $+3\mu C$ ⊕ ——— 4 ——— $-2\mu C$ ⊖ ——— 3 ——— $6\mu C$ ●

Find the force on the $6\mu C$ charge from the other 2.

$$F_e = \frac{(9\times10^9)(3\mu C)(6\mu C)}{(7)^2}$$

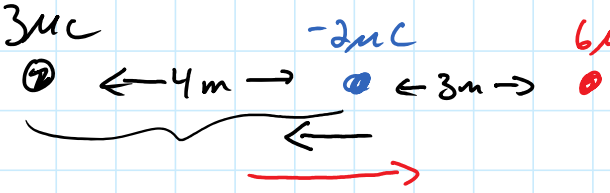
$$= 3.3\times10^{-3} N$$

$$F_e = \frac{(9\times10^9)(2\mu C)(6\mu C)}{3^2}$$

$$= 12\times10^{-3} N$$

$8.7\times10^{-3} N$ (left)

Ex



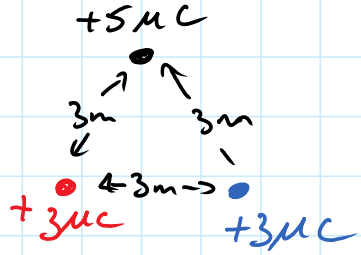

Find the force on -2μc.

$F_e = 3.4 \times 10^{-3}\ N$ (left)

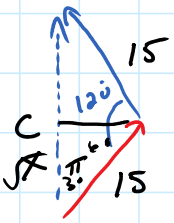
$F_e = 12 \times 10^{-3}\ N$ (right)

$8.6 \times 10^{-3}\ N$ (right)

Ex




Find force on + 5μc


$$F_e = \frac{(9\times10^9)(3\mu c)(5\mu c)}{3^2}$$

$$= 15 \times 10^{-3}\ N$$

$$c^2 = 15^2 + 15^2 - 2(15)(15)\cos 120^\circ$$

$$c = 25.98 \times 10^{-3}\ N$$