Review of Review:

1). Newton's Law of Gravitation.

~~por~~ Attraction between points

Integration → Attraction between extensive objects.

2). Energy.

$$W = \int_i^f \vec{F} \cdot d\vec{r}$$

Dot product.

Line integral.

Meaning??

$\Delta U = -W$ for conservative forces.

3). Cross product (Torque).

$\vec{A} \times \vec{B}$,

N ↘

C ↙ C. ↙

$$F = \frac{1}{4\pi\varepsilon_0} \cdot \frac{Q_1 Q_2}{r^2}$$

r^2 ↖ m.

$$N = \frac{1}{[\varepsilon_0]} \cdot \frac{C^2}{m^2} \Rightarrow$$

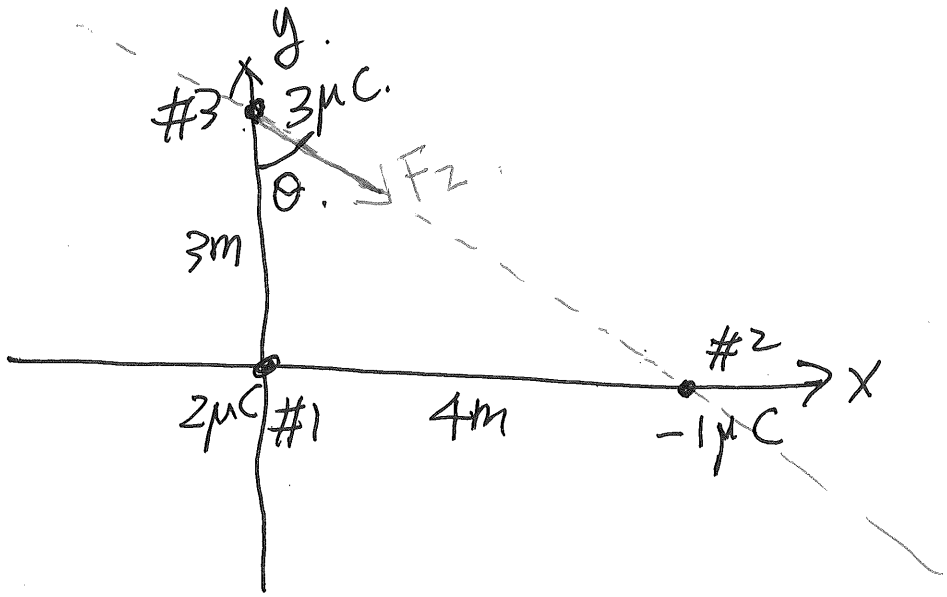
$$\Rightarrow [\varepsilon_0] = C^2 m^{-2} N^{-1}$$

$$k = \frac{1}{4\pi\varepsilon_0}$$

↑ why?

SI (MKS)

"rational" system.



Total force on #3

~~Force~~ Force due to #1 = $\vec{F}_{\#1}$

$$F_{1x} = 0.$$

$$F_{1y} = + \frac{1}{4\pi\varepsilon_0} \cdot \frac{(2\times10^{-6})(3\times10^{-6})}{3^2}$$

$$= + \frac{1}{4\pi\varepsilon_0} (0.667\times10^{-12}).$$

Forces due to #2 = $\vec{F}_2$

$$|\vec{F}_2| = \frac{1}{4\pi\varepsilon_0} \cdot \frac{(3\times10^{-6})(1\times10^{-6})}{5^2}$$

$$= \frac{1}{4\pi\varepsilon_0} (0.125\times10^{-12}).$$

$$F_{2x} = \frac{1}{4\pi\varepsilon_0}(0.12\times10^{-12})\underbrace{\sin\theta}_{=\frac{4}{5}}$$

$$= \frac{1}{4\pi\varepsilon_0}(0.096\times10^{-12}).$$

$$F_{2y} = -\frac{1}{4\pi\varepsilon_0}(0.12\times10^{-12})\underbrace{\cos\theta}_{\frac{3}{5}}.$$

$$= -\frac{1}{4\pi\varepsilon_0}(0.072\times10^{-12}).$$

$$F_{\text{Total }x} = F_{1x} + F_{2x}$$

$$= \frac{1}{4\pi\varepsilon_0}(0.096\times10^{-12})$$

$$= 8.988\times10^{9}\times 0.096\times10^{-12}$$

$$= \underline{8.63\times10^{-4}\ \text{N}}.$$

$$F_{\text{total}y} = \frac{1}{4\pi\varepsilon_0}(0.667\times10^{-12} - 0.072\times10^{-12})$$

$$= 8.988\times10^{9}\times 5.95\times10^{-13} = \underline{5.34\times10^{-3}\text{N}}$$