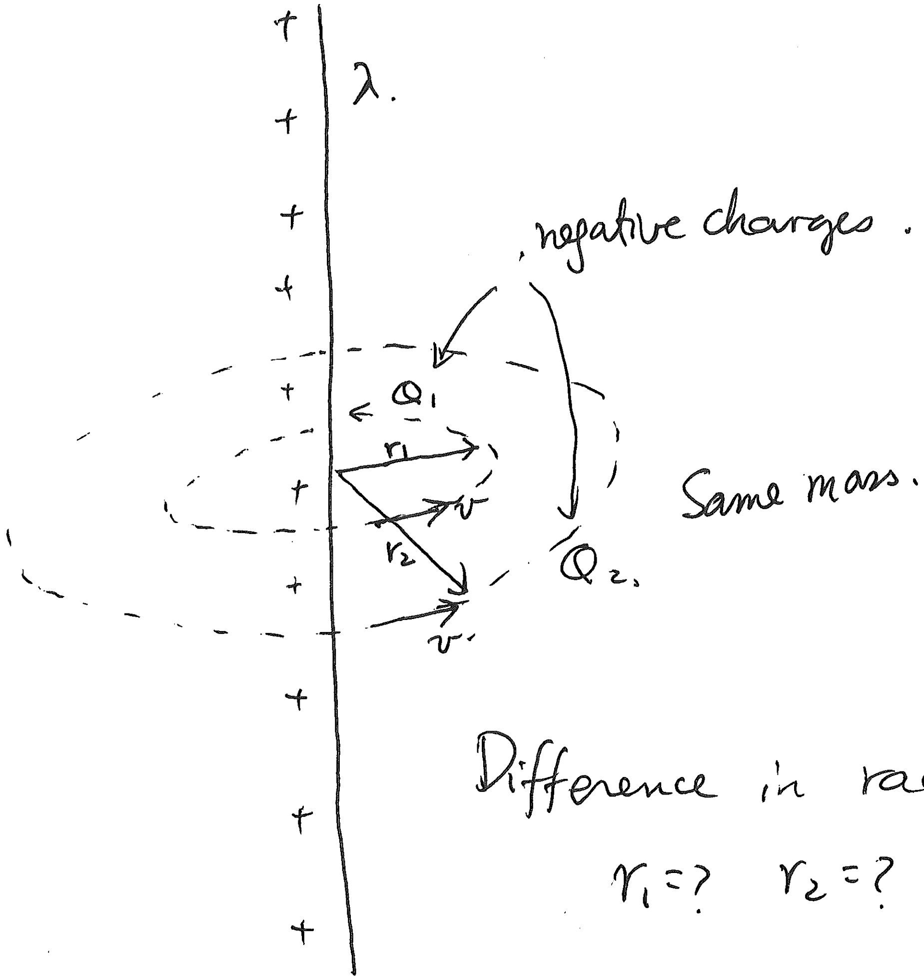


Difference in radius.

$r_1 = ?$ $r_2 = ?$

$$\varepsilon_0 \Phi = Q_{in}$$

$$\varepsilon_0 E A = Q_{in}$$

$$\varepsilon_0 E \cdot 2\pi r \cancel{L} = \lambda \cancel{L} \qquad (r = r_1 \text{ or } r_2).$$

$$\Rightarrow \cancel{\varepsilon_0}\ E = \frac{\lambda}{2\pi\varepsilon_0} \cdot \frac{1}{r}$$

$$F = ma$$

$$qE = ma$$

$$\cancel{q \cdot \frac{1}{4\pi\varepsilon_0} \frac{Q}{r} = m \frac{V^2}{r}}.$$

$$qE = m\frac{V^2}{r} \quad \text{or} \quad \frac{qE}{m} = \frac{V^2}{r}.$$

$$E = \frac{1}{4\pi\varepsilon_0} \frac{Q}{r^2}$$

$$\vdots$$

$$\boxed{q\vec{E} = m\vec{a}} \leftarrow$$

Equations of motion along the radial direction:

$$F = ma$$

$$qE = m\frac{v^2}{r}$$

$$q \cdot \frac{\lambda}{2\pi\varepsilon_0} \cdot \frac{1}{\cancel{r}} = m\frac{v^2}{\cancel{r}}.$$

independent of r!!

$$\frac{mv^2}{q} = \frac{\lambda}{2\pi\varepsilon_0} \text{ (constant)}.$$

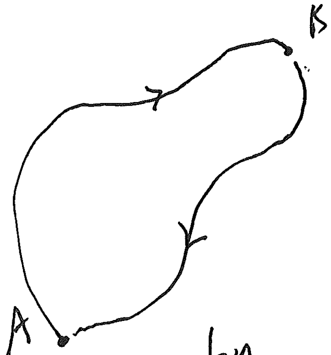
$$q \propto v^2. \quad \text{(same } m\text{)}.$$

$$\boxed{\Delta KE = \text{Work done by all forces}}$$ ← True for any kind of forces !!

← Fn

Conservative forces

Non-Conservative force (e.g. friction).



Work done by conservative force =0 for closed loop.