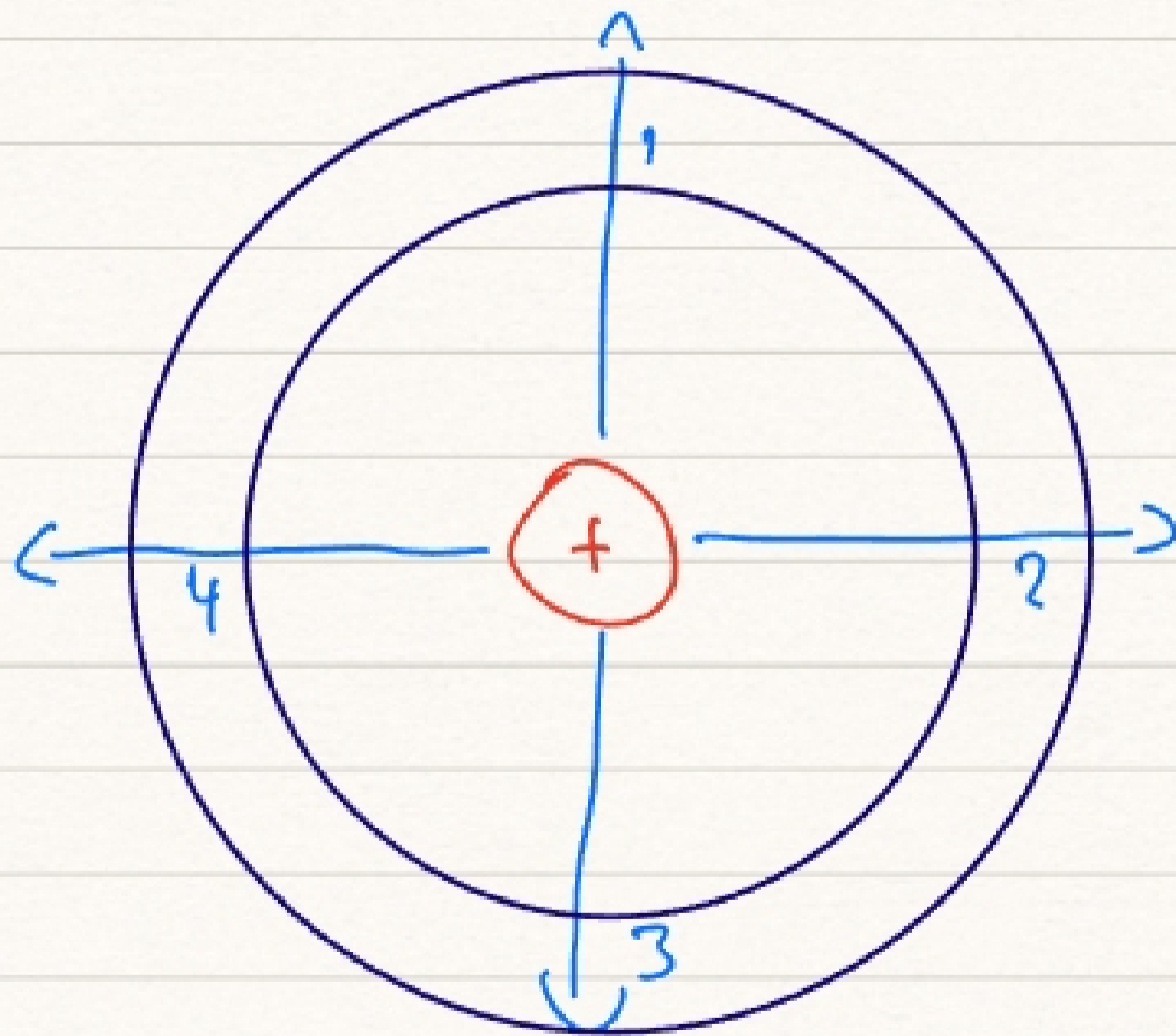
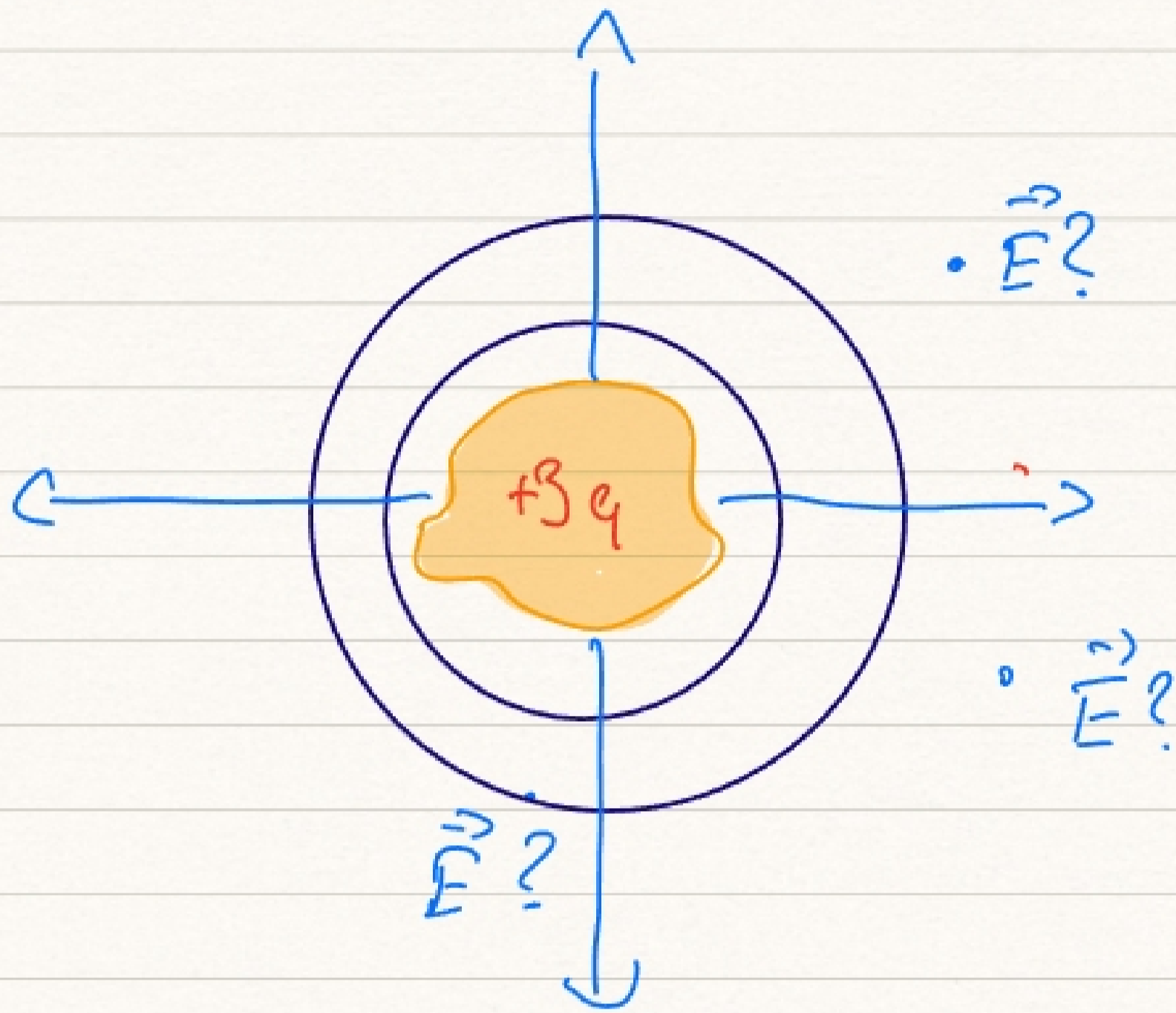
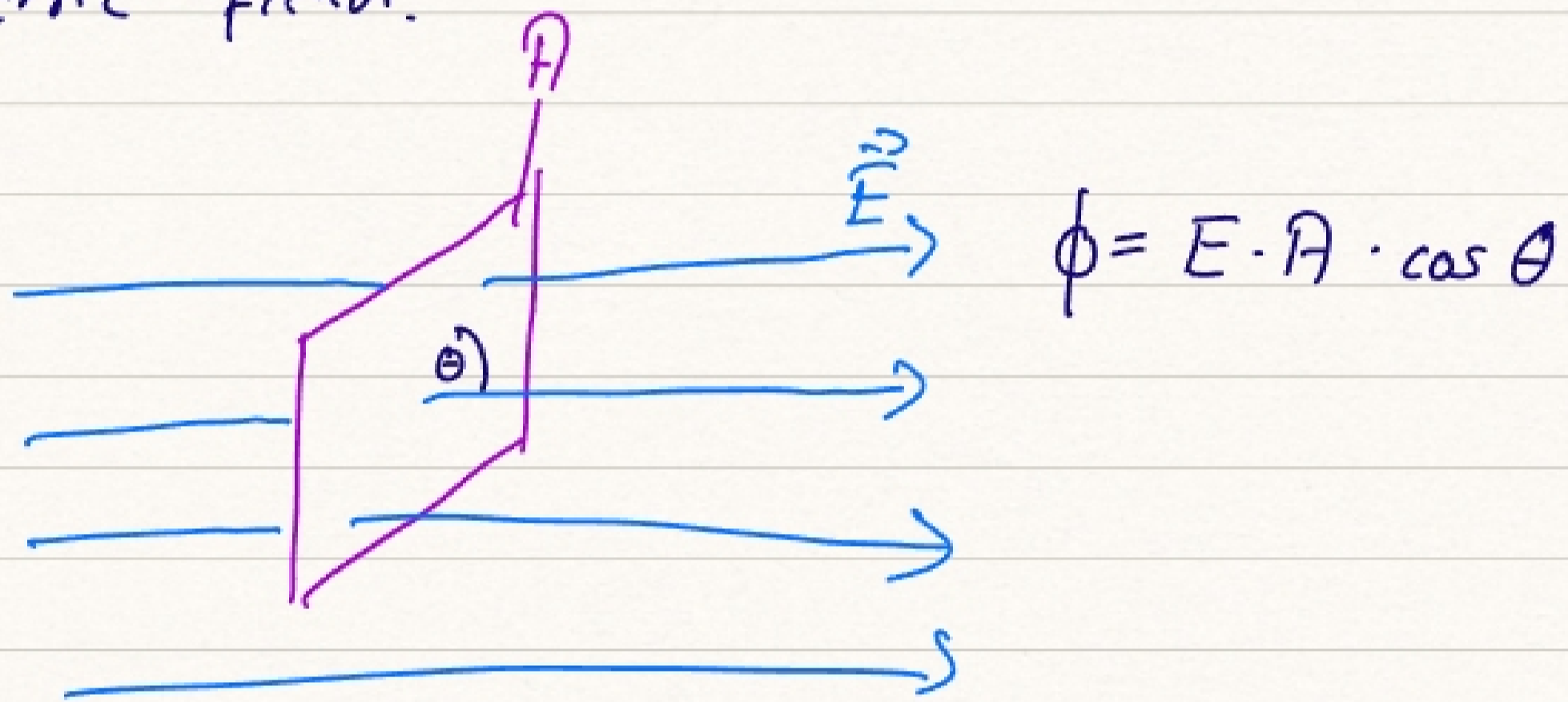


Gauss' law



Electric flux (ϕ) can be thought of as

the number of electric field lines going through a surface, which depends upon the angle between the surface and the electric field.

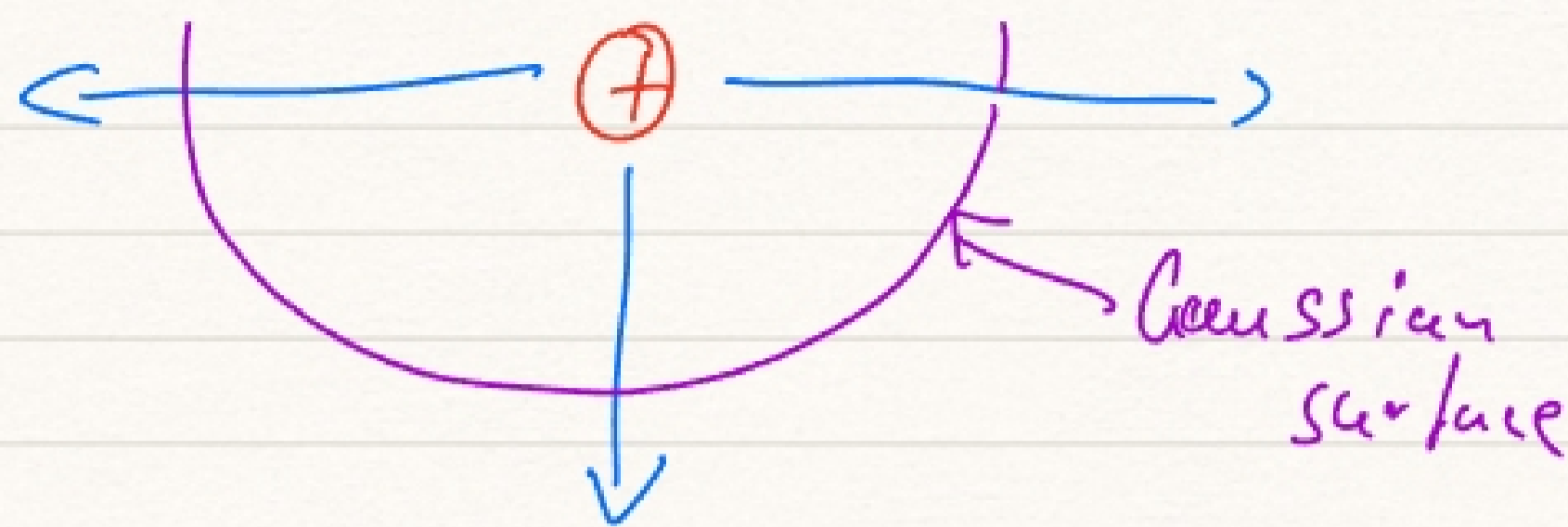


Gauss' law can be formulated as follows

The flux of \vec{E} through any closed surface is equal to the net charge q_{enc}/ϵ_0 enclosed by this surface

$$\epsilon_0 \phi = q_{enc} \quad \oint_S \vec{E} \cdot d\vec{A} = q_{enc}/\epsilon_0$$





Note 1: Gauss' law holds for any surface that is closed

Usually one particular surface makes the problem of determining the electric field easy

Note 2: When calculating the net charge inside a closed surface we take account of the sign of the charge

Note 3: When applying Gauss' law for a closed surface we ignore the charges outside the surface

Coulomb's law vs. Gauss law

Both laws describe the relationship between electric charge and the electric field.

One can derive Coulomb's law from Gauss' law and vice versa.