Physics 200

Chapter 24 Gauss's Law (Lecture Examples)

Ex: 1 Calculate the flux through the walls, floor and ceiling of a room with a charge placed in one of the corners of the room. (assume the room is a cube)

Ex: 2 Use Gauss's law to calculate the electric field strength a distance, R, from a point charge, Q.

Ex: 3 Use Gauss's law to calculate the electric field strength a distance, R, from the center of a conducting sphere of radius, a, with surface charge density, $\sigma$. ($R > a$) and ($R < a$)

Ex: 4 Use Gauss's law to calculate the electric field strength a distance, R, from the center of a non-conducting solid sphere of radius, a, with uniform charge density, $\rho$.

Ex: 5 Use Gauss's law to calculate the electric field strength a distance, a, from an infinite wire with linear charge density, $\lambda$.

Ex: 6 Use Gauss's law to calculate the electric field strength a distance, a, from a conducting infinite sheet with charge density, $\sigma$.

Ex: 7 Use Gauss's law to calculate the electric field strength a distance, a, from a non-conducting infinite sheet. The sheet has thickness, t, and charge density, $\rho$.

Ex: 8 Use Gauss's law to calculate the electric field strength a distance, R, from the center of a coaxial cable whose inner conductor has radius, a, and whose outer conductor has radius, b. The inner conductor has charge density, $\lambda$. and the outer conductor has charge density, $-\lambda$. The cable has length, L.

Ex: 9 Use Gauss's law to calculate the electric field strength a distance, R, from the center of a non-conducting sphere of radius, a, within a hollow conducting spherical shell whose inner radius is, b, and whose outer radius is, c. There is a charge - q on the sphere and a charge + Q on the hollow shell.

Ex: 10 Use Gauss's law to calculate the electric field strength inside and outside of a parallel plate capacitor. The plates have area, A, charge, Q and are separated by a distance, x.

Ex: 11 Use Gauss's law to calculate the electric field strength a distance, R, from the center of a non-conducting solid sphere with non-uniform charge density, $\rho = \alpha r$. ($R < a$)