Exercise 1

Calculate the solid angle subtended by an octant of a sphere at the centre of the sphere.

(Ans. $\frac{\pi}{2}$)
The flux per unit solid angle is known as the intensity.

Exercise 3

Find the electric field both inside and outside a spherical shell of radius carrying a uniform charge.

Exercise 4

Find the electric field in the region between two infinite parallel planes carrying charge densities $+\sigma$ and $-\sigma$.

Exercise 5

Find the electric field both inside and outside a spherical shell of radius $R$ carrying a uniform charge $Q$. 
Exercise 6

Find the electric field both inside and outside a long cylinder of radius $R$ carrying a uniform volume charge density $\rho$.

(Hint: Take the gaussian surface to be a finite concentric cylinder of radius $r$ (with $r < R$ and $r > R$), as shown)

Exercise 7

A very long cylinder carries a charge density $\rho = kr$, where $r$ is the distance from the axis of the cylinder. Find the electric field at a distance $r < R$.

(Ans. $\left(1/3\epsilon_0\right)kr^2\hat{r}$)

Exercise 8

A charge $Q$ is located at the center of a cube of side $a$. Find the flux through any of the sides.

(Ans. $Q/6\epsilon_0$)