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Proposal

For my final project, I was planning to look at the electric field for a spherical surface that also carries a uniform charge density. I plan to do problem 2.7 from the book and the problem involves looking at the electric inside and outside the spherical surface.

! **Problem 2.7** Find the electric field a distance z from the center of a spherical surface of radius R (Fig. 2.11) that carries a uniform charge density σ. Treat the case $z < R$ (inside) as well as $z > R$ (outside). Express your answers in terms of the total charge q on the sphere. [*Hint:* Use the law of cosines to write $\imath$ in terms of R and θ. Be sure to take the *positive* square root: $\sqrt{R^2 + z^2 - 2Rz} = (R - z)$ if $R > z$, but it's $(z - R)$ if $R < z$.]

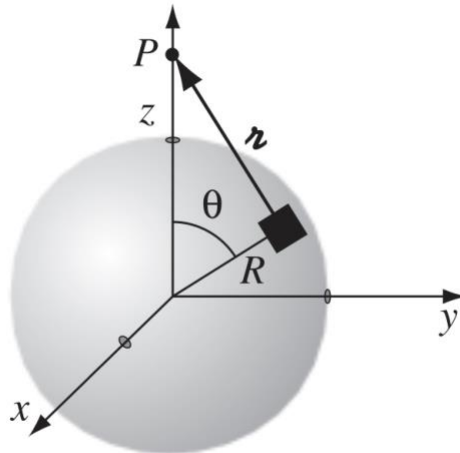The problem also has a figure that goes along with it:

FIGURE 2.11

In homework problems, we went over how to find electric fields a distance from a point charge and we also went over problems involving line charges but for this situation, there will be a charge density spread across an entire spherical surface. The electric field will need to also be broken down into its components in the z-direction, the x-direction, and also the y-direction. This problem will use the techniques we've used for finding the electric field at a point due to a charge, a surface of charge, and also a ring of charge. This problem will also involve components of ϕ and θ so this problem will be much more in depth and complex and the previous problem done in the homeworks.