



1. (a) {3 pts} Give the potential for a static point electric dipole, with dipole moment \mathbf{p} , located at the origin and pointing in an arbitrary direction (see Figure).
- (b) {3 pts} If the dipole moment points in the z -direction ($\mathbf{p} = p \hat{\mathbf{z}}$) and is surrounded by a thin grounded conducting sphere of radius b (see Figure), what is the electrostatic potential inside the sphere?
- (c) {4 pts} Compute the static electric charge density that exists on the inner surface of the thin conducting sphere?

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E+M #1

Gaussran

- a) The general potential for an electric dipole is:

$$\Phi = \frac{\vec{p} \cdot \vec{r}}{r^3}$$

- b) Since our conducting spherical shell is grounded, we proceed by the method of images to determine