

3-12 Charge is distributed with constant surface charge density σ on a circular disc of radius a . The disc lies in the xy plane with center at the origin. Show that the electric field at a point on the z axis is given by

$$\mathbf{E} = \hat{\mathbf{z}} \frac{\sigma}{2\epsilon_0} \left(\frac{z}{|z|} \right) \left[1 - \frac{|z|}{(a^2 + z^2)^{1/2}} \right] \quad (3-15)$$

What does this become as $a \rightarrow \infty$?