1) The ring shown below has radius $R$ and uniformly distributed charge $Q$. The $z$-axis is perpendicular to the plane of the ring, and goes through its center. What is the magnitude of the electric field at (a) $z = 0$, and (b) $z = \infty$? (c) In terms of $R$, at what positive value of $z$ is the magnitude maximum? 

*Hint: For part (c), you need to find the value of $z$ at which $dE/dz = 0$."

2) Suppose the thin rod shown below has uniformly distributed charge $+Q$. (a) What is the magnitude and direction of the $E$-field produced at point $P$? Give your answer in terms of $L$ and $R$. (b) Suppose the rod has linear charge density $\lambda = Q/L$, and is infinitely long. What is the magnitude and direction of the $E$-field produced at point $P$? Give your answer in terms of $\lambda$ and $R$. 

*Hint: The $x$-components of the $E$-fields due to tiny charge elements $dq = \lambda dx$ all cancel after adding them up (or integrating)."