Problem 1 - wire above conducting plane
A wire with a line charge of $\rho_l$ sits at a height $a$ above a grounded conducting plane.

In order to do this problem, you will need to use the potential of an isolated line charge which is given by $V = (\rho_l/2\pi\epsilon) \ln(r_{\text{ref}}/r)$ where $r_{\text{ref}}$ is the distance between the line charge and the voltage reference.

a. What is the voltage in the problem with a line charge and the conducting plane?
b. What is the electric field just above the ground plane?
c. What is the charge density on the ground plane?