Chapter 3a – Laplace and Images

1) Determine the work required to bring a positive charge a distance d away from a conductor.

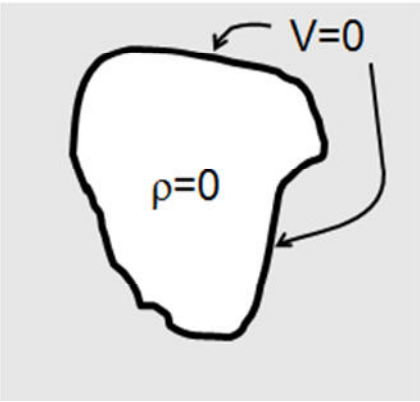
2) Find a numerical solution to the Laplace equation in 1D between two potentials: 10V and 0V.

3) Find a numerical solution to the Laplace equation in a 2D square surface between four potentials knowing the following potentials: V(x,0)=10 V, V(0,y) = 0 V, V(10,y) = 10 V, V(x,10)=-10V.

4) Poisson's equation tells us that $\nabla^2 V = -\rho/\varepsilon_0$. If the charge density throughout some volume is zero, what else must be true throughout that volume:

A) V=0
B) E=0
C) Both V and E must be zero
D) None of the above is necessarily true

5) A region of space contains no charges. The *boundary* has V=0 everywhere. What can I say about V in the interior?



A) Not much, there are lots of possibilities for V(r) in there
B) V(r)=0 everywhere in the interior.
C) V(r)=constant everywhere in the interior

Concept Question

Name: _____

Find the solution to Laplace's equation in 1D.

One-Minute Paper

Please answer the following questions about today's lecture:

1) What was the most important thing you learned today?

2) What is the one thing that remains most unclear at the conclusion of today's lecture?

3) Any additional comments?