Lecture 16 outline:

- Exam protocol/questions
- "Things to know"
- Problem 2-4
  - Potential inside a pentagon
- Problem 2-8
  - Field outside a cylinder
- Problem 3-2
  - Four ways to say $\vec{E} = -\nabla V$
- Problem 3-9
  - Potential and field above a disk of uniform charge
- Problem 3-10
  - Behavior of charges & fields for two charges in a sphere.

Method of Images

Things to know for exam

$$\oint \vec{E} \cdot d\vec{a} = \frac{Q_{enclosed}}{\epsilon_0}$$

How to draw a Gaussian surface.
How to calculate Q_{enc} for lines, planes, cylinder, spheres

$\vec{F} = q\vec{E}$ $\quad U = qV$

$$\vec{E} = \frac{1}{4\pi\epsilon_0} \int \frac{\hat{r}\, dq}{r^2}$$

How to calculate $\vec{r}$, $\hat{r}$
How to evaluate dq for lines, planes, solids

$\nabla \cdot \vec{E} = \rho / \epsilon_0$

$\vec{E} = -\nabla V$

$$V = \int_{\vec{a}}^{\vec{b}} \vec{E} \cdot d\vec{l}$$

$$V = \frac{1}{4\pi\epsilon_0} \int \frac{dq}{r}$$

Behavior of conductors and field lines

Gauss's Law for charges in and out of surfaces

Flux

How to calculate with a δ fn

Why $\nabla \times E = 0$, $\oint E \cdot dl = 0$, $E = -\nabla V$, $\int_{\vec{a}}^{\vec{b}} \vec{E} \cdot d\vec{l}$ is path independent are equivalent

$Q = CV$ How to go from Q to V to C