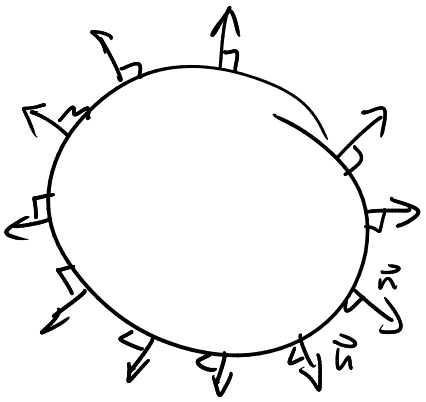


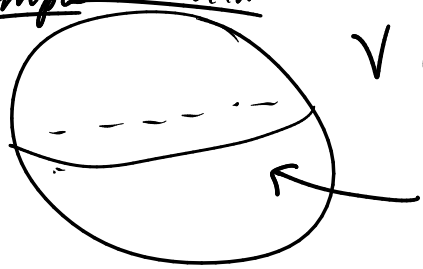
Require directional derivative $\vec{n} \cdot \nabla u = 0$
In heat case this corresponds to insulated boundary.

Other applications: Electro static potential $V(x,y,z)$
Electric field $\vec{E} = \nabla V$.
Gauss' law $\nabla \cdot \vec{E} = \rho$ where ρ is charge density.
If $\rho = 0$:

$$0 = \nabla \cdot \vec{E} = \nabla \cdot (\nabla V) = \nabla^2 V = \Delta V$$

So V satisfies Laplace's equation in regions where no charge is present.

Example situation:



V is specified on boundary of sphere

$\Delta V = 0$ inside.

In this course we will solve Laplace's equation on a rectangle With Dirichlet boundary conditions.