

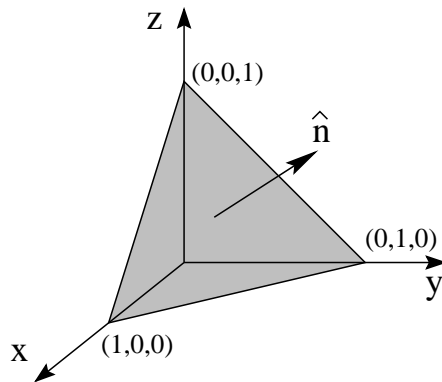
## Static Vector Fields Homework 1

Due 11/11/09

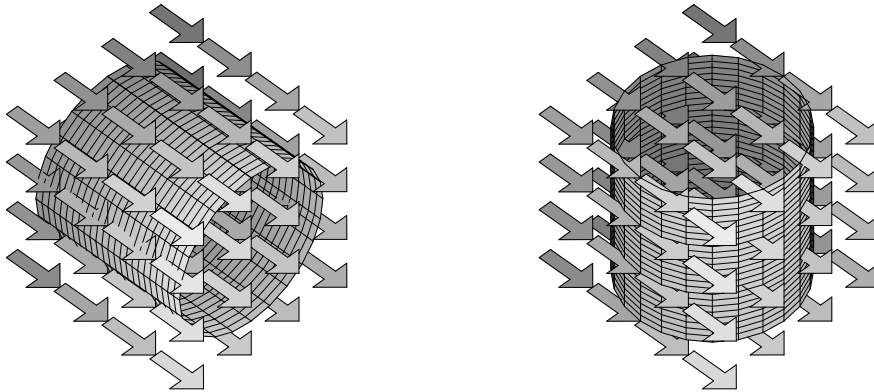
### PRACTICE:

1. (Griffiths 1.5):

Use the cross product to find the components of the unit vector  $\hat{n}$  perpendicular to the plane shown in the figure below, i.e. the plane joining the points  $\{(1, 0, 0), (0, 1, 0), (0, 0, 1)\}$ .



2. What do you think will be the flux through the cylindrical surface that is placed as shown in the constant vector field in the figure on the left? What if the cylinder is placed upright, as shown in the figure on the right? Explain.



### REQUIRED:

1. Find the upward pointing flux of the electric field  $\vec{E} = E_0 z \hat{z}$  through the part of the surface  $z = -3r^2 + 12$  (cylindrical coordinates) that sits above the  $(x, y)$ -plane.
2. A charge  $q$  sits at the corner of a cube. Find the flux of  $\vec{E}$  through each side of the cube. **Do not do a messy calculation!**