NAME:

Problem 1. Find an equation of the line of intersection of the planes Q and R where

$$Q : -x + 2y + z = 1 \qquad n_Q = \langle -1, 2, 1 \rangle$$

$$R : x + y + z = 0 \qquad n_R = \langle 1, 1, 1 \rangle$$

$z = 0$:

$-x + 2y = 1 \longrightarrow x = 2y - 1$

$x + y = 0$

$2y - 1 + y = 0$

$3y = 1$

$y = \frac{1}{3}$

$x = \frac{2}{3} - 1 = -\frac{1}{3}$
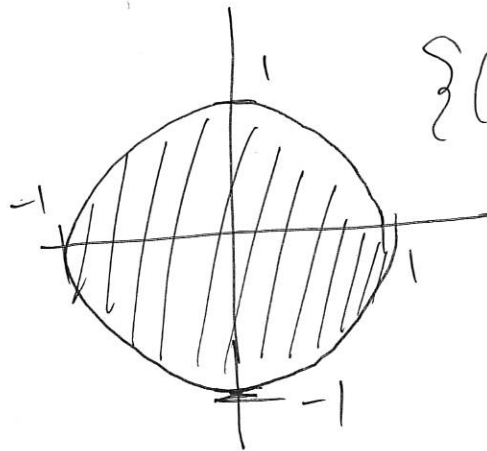
Point: $\left(-\frac{1}{3}, \frac{1}{3}, 0 \right)$

$$\begin{vmatrix} \bar{\imath} & \bar{\jmath} & k \\ -1 & 2 & 1 \\ 1 & 1 & 1 \end{vmatrix} = \bar{\imath}(2 - 1) - \bar{\jmath}(-1 - 1) + \bar{k}(-1 - 2)$$

$$= \langle 1, 2, -3 \rangle$$

$$r(t) = \langle -\frac{1}{3}, \frac{1}{3}, 0 \rangle + t \langle 1, 2, -3 \rangle$$

$$= \langle -\frac{1}{3} + t, \frac{1}{3} + 2t, -3t \rangle$$

Problem 2. Find and sketch the domain of the function $g(x, y) = \sqrt{1 - x^2 - y^2}$.

$1 - x^2 - y^2 \geq 0$

$1 \geq x^2 + y^2$

$\{(x, y) : x^2 + y^2 \leq 1\}$