Worksheet March 3

1. (This is the same problem as on the Feb. 28 worksheet, but now you have a new way to do it.) Let S be the positively oriented boundary of the region $x^2 + z^2 \leq y \leq 1$. Find the flux of the vector field $\mathbf{F}(x, y, z) = \langle x, 5, z \rangle$ across S.

2. Let $\mathbf{F}$ be as in the previous problem and let S_1 be the surface $y = x^2 + z^2$, $0 \leq y \leq 1$ with the "leftward" pointing normal. (So S_1 is the parabolic part of the surface S in problem 1.) Use your solution to problem 1 along with a computation of the flux of $\mathbf{F}$ across the disk making up the other part of S to obtain an alternative method for computing the flux of $\mathbf{F}$ across S_1.