

## In-Class Quiz 8: Surface integrals (§14.6)

Directions: This quiz is due at the end of lecture.

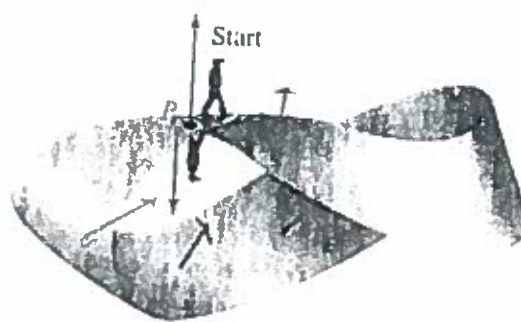
1. Recall, the formula for a line integral over a scalar function is given by

$$\int_C f \, ds = \int_a^b f(x(t), y(t), z(t)) \| \mathbf{r}'(t) \| \, dt.$$

If  $f$  is a function on a smooth surface  $S$  parametrized by  $\mathbf{r}(u, v)$  and the derivatives  $\mathbf{r}_u$  and  $\mathbf{r}_v$  are continuous, then the formula for the surface integral is given by

$$\iint_S f(x, y, z) \, dS = \iint_R f(x(u, v), y(u, v), z(u, v)) \| \mathbf{r}_u \times \mathbf{r}_v \| \, dA$$

2. Consider the surface pictured below. Why do we not integrate functions on this surface in this course?



This surface is not orientable —  
it is not possible to draw a well-defined  
normal vector on it.