MAC 2313 Cal3   **Quiz 10**   8 Apr 2003   <u>Name:</u>

Show **ALL** work for credit; be neat. Calculators can be used for graphing and calculating only. Give exact answers when possible.

1. If $\mathbf{F} = \langle 2, 3, 5 \rangle$ and S surface given below, compute the flux integral (without integrating)

$$\iint_S \mathbf{F} \cdot d\mathbf{A}$$

When there is a choice of normal, pick the normal whose dot product with $\mathbf{F}$ is positive.

A. S is the rectangle $\{(x, y, 0) : -2 \le x \le 2, 3 \le y \le 5\}$ in the xy-plane.

B. S is an equilateral triangle with side 2 and normal $\mathbf{k}$.

C. S is a circle with radius 5 in the yz-plane.

D. S is a unit square that is contained in the plane $x + y + z = 1$.

2 Verify Green's Theorem by computing both sides of

$$\oint_C \mathbf{F} \cdot d\mathbf{r} = \iint_D Q_x - P_y \; dA$$

Here $\mathbf{F} = \langle y, -x \rangle$, C is the closed curve $\mathbf{r}(t) = \langle 3 \cos 2t, 3 \sin 2t \rangle$ for $0 \le t \le \pi$ and D is the region inside C.