M225
Spring 2009

Quiz 11

Name:_____

This is a **group quiz**, so you should speak to your neighbor(s). You may use a calculator, your notes and/or the textbook.

1. If the curve C is parameterized by $\langle t^2 - t, 2t + 4\rangle$, then compute:

   (a) $ds =$

   (b) $d\vec{r} =$

   (c) Set up the arc length integral for $0 \leq t \leq 1$.

2. If the surface S is parameterized by $\langle x, y, 3x^2 - xy + 5\rangle$ then compute:

   (a) $\vec{r}_x \times \vec{r}_y =$

   (b) $d\vec{S} =$ $\qquad\qquad$ $dS =$

   (c) Set up the integral for the surface area over the rectangle $0 \leq x \leq 3, -1 \leq y \leq 2$

   (d) The surface normal, $\vec{n} =$

   (e) If the vector field $\vec{F} = \langle x, y, z^2\rangle$, set up the integral: $\iint_S \vec{F} \cdot d\vec{S}$

3. Is $\displaystyle\int_C \vec{F} \cdot d\vec{r} = \int_C f(x,y)\, ds$? Explain.

4. Is $\displaystyle\iint_D g(x,y,z)\, dS = \iint_S \vec{F} \cdot d\vec{S}$? Explain.

5. Is $\int_C \vec{F} \cdot d\vec{r} = \int_C P\, dx + Q\, dy$?

6. Is $\iint_S \vec{F} \cdot d\vec{S} = \iint_S \vec{F} \cdot \vec{n}\, dS$?

7. Given surface S over domain D, is $\iint_S \vec{F} \cdot dS = \iint_D \vec{F} \cdot (\vec{r}_x \times \vec{r}_y)\, dA$?

8. Set up the integral (DO NOT EVALUATE) representing the flux of $\vec{F}$ across the surface S, if the orientation is upward, and

$$\vec{F} = \langle y, x, z^2 \rangle \qquad z = 4 - x^2 - y^2 \qquad 0 \leq x \leq 1, 0 \leq y \leq 1$$

9. Set up the integral for the surface area of $4x - 2y + 2z = 4$ above the unit circle in the plane.

10. Set up the integral $\iint_S y \, dS$, if the surface is given by the part of the cone $x^2 + y^2 = z^2$ that lies between the planes $z = 1$ and $z = 3$.