Name:

Math 241, Section F1H, Fall 2007
Graded HW Assignment 12, Due 11/15/2007
NOTE EARLY DEADLINE
Revised version (last two problems have been dropped)

Comments

- **Applying Stokes' Theorem:** Stokes' Theorem relates a line integral to a surface integral. This can be applied in two ways: (i) Computing a line integral over a closed curve by converting it to a surface integral (see Problems 6–10 in 14.7). (ii) Computing a surface integral by converting it to a line integral over the boundary curve of the surface (see Problems 1–5 in 14.7). Both types of applications are important, as in some situations the line integral is the easier one to compute, whereas in others it's the surface integral.
- **Problem 14.7:5:** This requires the extended version of Stokes' theorem which allows surfaces to have "holes" and multiple boundary curves. The formula is the same except that every boundary curve contributes a term on the left, and that the boundary curves should be oriented so that the surface is always to the left. (See the handout "Technical assumptions ..." for sketches of surfaces (in 2 dimensions) with corresponding boundary curves.)
- **Problem 14.7:7:** Compare to Example 1.
- **Problems 14.7:11 and 14.7:14:** These are exercises in finding an antiderivative (potential) for a vector field $\vec{F}$. This can be done either by "integration by parts" (as in 14.3:28), or by using the Fundamental Theorem for Line Integrals with a simple (e.g., linear) path, as illustrated in Example 3.
- **Problem 14.7:15:** This is another exercise in using the definition of the ∇ operator, similar to the problems in 14.1. Do only parts (c) and (d).

Problems

1. 14.7:1
2. 14.7:5
3. 14.7:7
4. 14.7:9
5. 14.7:11
6. 14.7:14
7. 14.7:15(c)(d)
8. ~~14.M: 17~~ (dropped)
9. ~~14.M: 18~~ (dropped)