11/21/2002

Special Bonus Offer!!!

only for students in Math 291

Are you concerned about exam grades? Are you worried that your grade will be ε below the boundary between one grade and another (between B and B+, or between A and A+)? Generous contributions from national and local corporations and considerable cooperation from the university administration allow the **Management of Math 291** to make the following unprecedented offer: you may receive as many as **5 BONUS POINTS** to be added to your second exam grade!

> Prove Green's Theorem ($\int_C P(x,y)\,dx + Q(x,y)\,dy = \int\int_R \frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\,dA$) if R is the triangular region in the xy-plane which is bounded by the positive x-axis, the positive y-axis, and line $x + y = 1$, and if C is the oriented boundary of R: the line segment from $(0,0)$ to $(1,0)$, followed by the line segment from $(1,0)$ to $(0,1)$, and completed by the line segment from $(0,1)$ to $(0,0)$. $P(x,y)$ and $Q(x,y)$ are functions with continuous first partial derivatives on C and all of R.

Rules for this offer

1. The proof will be a verification similar to what was done in class for the unit square in $\mathbb{R}^2$. I suggest starting with the double integral, converting it as appropriate to iterated integrals, and manipulating the results and recognizing the answer as line integrals. The writeup need not be elaborate. It should be similar to what you would do if this were an exam problem. That is, what's handed it does not need to be a workshop solution, just a solution of an exam problem.

2. You may **not** discuss this work with other students. You may refer to the text, your class notes, and the class diary entry on the web. If you need to, you may talk to me or send me e-mail. I would prefer that you complete this work without my help, however.

3. I hope you will do this problem. If you do, hand it in with the rest of your exam on Tuesday. It will be graded, and a maximum of 5 points will be added to your exam grade.