Name: Section (circle one): 10-11 11-12

1. Let f and g be scalar functions of three variables with continuous second-order partial derivatives. Compute $\operatorname{div}(\nabla f \times \nabla g)$. To get full credit on this problem, you must simplify completely. (This is exercise 28 in section 16.5. Exercises 23-29 in that section asked you to prove various identities involving divergence, curl, and the Laplacian. If you can remember what any of those exercies *other* than number 28 say, you may use them without proving them.)

2. Find the flux of the vector field $\mathbf{F}(x, y, z) = \frac{x}{(x^2+y^2+z^2)^{3/2}} \cdot \mathbf{i} + \frac{y}{(x^2+y^2+z^2)^{3/2}} \cdot \mathbf{j} + \frac{z}{(x^2+y^2+z^2)^{3/2}} \cdot \mathbf{k}$ through the surface $x^2 + y^2 + z^2 = 1$, oriented outward.