

Review problems

Name: _____

Math 202 quiz problems from 2006

1. Begin evaluating $\int_C F \cdot d\mathbf{s}$, where $F(x, y) = (xy, y - x)$ and C is the straight-line path from $(4, 4)$ to $(5, -2)$. You may leave your answer in a form where only Calculus I/II knowledge is needed to complete the work.

2. Find a potential function f for the vector field

$$F(x, y) = \left(2 + \frac{1}{xy} - y, 2y - x - \frac{\ln x}{y^2} \right),$$

and use it to evaluate $\int_C F \cdot d\mathbf{s}$ where C is parameterized by

$$\mathbf{r}(t) = (t^2, \cos(\pi t) + 3), \quad 1 \leq t \leq 2.$$

3. For $F(x, y, z) = (xz + y, x + yz, x^2 + y^2)$:

(a) Compute $\text{curl } F(1, 0, 0)$.

(b) Assuming F represents a velocity field for a fluid flowing, interpret the result in part (a). (What does it tell you about the vector field?)

4. Use Green's theorem to evaluate

$$\oint_C F \cdot d\mathbf{s},$$

where $F(x, y) = (y^2, xy)$ and C is the boundary of the triangle with vertices $(0, 0)$, $(1, 0)$, and $(0, 1)$, traced in a counterclockwise direction.