

Review Worksheet

Tu, Apr. 23

1. Green's Theorem

- (a) Intuitively, what does Green's theorem say?
- (b) Let $\mathbf{F} = \langle e^x, x + \sin(y^2) \rangle$ and consider the curve C composed of the three line segments, $(1, 0)$ to $(1, 1)$ to $(-1, 1)$ to $(-1, 0)$. Find the line integral of \mathbf{F} along C .

2. Stokes' Theorem

- (a) Intuitively, what does Stokes' Theorem say?
- (b) Compute $\iint_S \text{curl } \mathbf{F} \cdot d\mathbf{S}$ where S is the part of the surface $z = xy$ in the cylinder $x^2 + z^2 = e^2$ and $\mathbf{F} = -y\mathbf{i} + x\mathbf{j} + z\mathbf{k}$.

3. The Divergence Theorem

- (a) Intuitively, what does the Divergence Theorem say?
- (b) Compute $\iint_S \mathbf{F} \cdot d\mathbf{S}$ where S is the part of the surface $y = x^2 + z^2$ below the plane $y = 1$ and $\mathbf{F} = \langle ze^{\cos y}, y + xz, e^{\sin^2 y} \rangle$.