

Green's Theorem

- Show that $\mathbf{F}(x, y) = (yx^2)\mathbf{i} + (xy^2)\mathbf{j}$ is *not* conservative.
 - For \mathbf{F} as above, use Green's Theorem to evaluate $\int_C \mathbf{F} \cdot d\mathbf{r}$, where C is the series of line segments from $(0, 1)$ to $(2, 1)$, from $(2, 1)$ to $(2, 0)$, from $(2, 0)$ to $(0, 0)$, and finally from $(0, 0)$ to $(0, 1)$.
- Use Green's Theorem to evaluate

$$\int_C (\tan x + y) dx + (2x - \sin(y^2)) dy$$

where C is the line from $(2, 4)$ to $(-2, 4)$, followed by the curve $y = x^2$ from $(-2, 4)$ to $(2, 4)$.