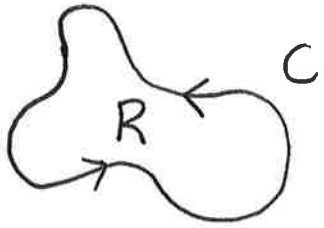
§31

Below, C is a counterclockwise simple closed curve in $\mathbb{R}^2$, bounding a region R.



Green's Theorem

$\vec{F}: \mathbb{R}^2 \to \mathbb{R}^2$, $\vec{F} = (F_1, F_2)$.

$$\oint_C F_1\,dx + F_2\,dy = \iint_R \left(\frac{\partial F_2}{\partial x} - \frac{\partial F_1}{\partial y} \right) dA$$

$$\text{Area}(R) = \frac{1}{2} \oint_C -y\,dx + x\,dy$$