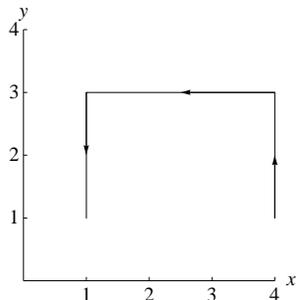


The Integral Theorems

1. Let C be the curve in \mathbb{R}^2 consisting of line segments from $(4, 1)$ to $(4, 3)$ to $(1, 3)$ to $(1, 1)$. Let $\vec{F}(x, y) = \langle x + y, (y - 1)^3 e^{\sin y} \rangle$. Evaluate the line integral $\int_C \vec{F} \cdot d\vec{r}$.



2. Let C be the (oriented) curve parameterized by $\vec{r}(t) = \langle \cos t, \sin t, t \rangle$, $0 \leq t \leq 2\pi$. Let $\vec{F}(x, y, z) = \langle e^{x^2}, (\sin y + 3)^y, z^2 \rangle$. Evaluate $\int_C \vec{F} \cdot d\vec{r}$.