LINE INTEGRALS

1. Evaluate $\int_C xy\,ds$ where C is the unit circle traversed once in the counterclockwise direction.

2. Evaluate $\int_C xy\,dx$ where C is the unit circle traversed once in the counterclockwise direction.

3. Evaluate $\int_C xy\,dy$ where C is the unit circle traversed once in the counterclockwise direction.

4. Evaluate $\int_C xy\,ds$ where C is the straight line from $(0,0)$ to $(2,4)$.

5. Evaluate $\int_C xy\,dx$ where C is the straight line from $(0,0)$ to $(2,4)$.

6. Evaluate $\int_C xy\,dy$ where C is the straight line from $(0,0)$ to $(2,4)$.

7. Evaluate $\int_C x\,ds$ where C is the curve $y = x^2$ where $0 \le x \le 1$.

8. Evaluate $\int_C x\,dx$ where C is the curve $y = x^2$ where $0 \le x \le 1$.

9. Evaluate $\int_C x\,dy$ where C is the curve $y = x^2$ where $0 \le x \le 1$.

10. Suppose a wire is shaped into a path corresponding to $x = \cos t$, $y = \sin t$, and $z = t/5$ for $0 \le t \le 6\pi$, and suppose also that the density of the wire in terms of mass per unit of length changes with elevation according to the function $w(x, y, z) = z$. Then find the mass of the wire.