MATH 112A Review: Line Integrals, Surface Integrals, Parametrization of Curves

1. Let $F(x,y) = (x^2+y^2, 0)$ and consider the curve C that lies on the unit circle and $x, y \geq 0$ with counterclockwise orientation. Compute

$$\int_C F(\vec{r}) \cdot d\vec{r}(t).$$

2. Let S be the collections of points in the xy-plane that satisfy $x^2+y^2 \leq 1$. Evaluate

$$\iint_S F(x,y,z) \cdot d\vec{S},$$

where $F(x,y,z) = (xyz, x^4, 1)$.

3. Let S be the collections of points in the xy-plane that satisfy $0 < x^2+y^2 \leq 1$. Evaluate

$$\iint_S f(x,y,z) dS,$$

where $f(x,y,z) = \frac{1}{\sqrt{x^2+y^2}}$.