Multivariable Calculus Unit 4 Study Guide

1 Volume Given Bounds

Given integer bounds:

$$\iint_R xcos(xy)cos^2(\pi x)\,dA \quad R = [0, \frac{1}{2}] \times [0, \pi]$$

$$\int_0^{\frac{1}{2}} \int_0^{\pi} xcos(xy)cos^2(\pi x)\,dydx$$

$$\int_0^{\frac{1}{2}} \left[cos^2(\pi x)sin(xy)\right]_0^{\pi}\,dx$$

$$\int_0^{\frac{1}{2}} \left[cos^2(\pi x)sin(\pi x)\right]\,dx$$

$$\left[-\frac{1}{3\pi}cos^3(\pi x)\right]_0^{\frac{1}{2}} = \frac{1}{3\pi}$$

2 Area from Double Integrals

3 Area and Volume in Polar

4 Surface Area