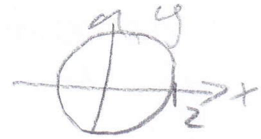
MAC 2313 Quiz 8 Name DeVe

Calculus III

1. Evaluate the integral $\int_R \sin(x^2+y^2)\, dA$ where R is the disk of radius 2 centered at the origin.

$\int_0^{2\pi}\int_0^{2} r\sin(r^2)\,dr\,d\theta$ $\quad u=r^2$, $du=2r\,dr$

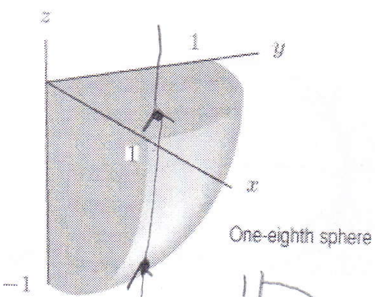


$\frac{1}{2}\int_0^{2\pi}\int \sin(u)\,du\,d\theta = -\frac{1}{2}\int_0^{2\pi}\cos(r^2)\Big]_0^2 d\theta = -\frac{1}{2}\int_0^{2\pi}\cos(4)-1\,d\theta$

$= \frac{1}{2}(1-\cos(4))\int_0^{2\pi} d\theta = \frac{1}{2}(1-\cos(4))\theta\Big]_0^{2\pi} = \pi(1-\cos(4))$

≈ 5.195

2. For the eighth of the sphere shown, W, set up the integral you would use to integrate $\int_W dV$ in



A) Cartesian (rectangular)

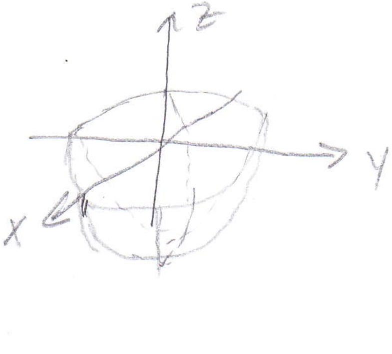
$\int_0^1\int_0^{\sqrt{1-x^2}}\int_{z=-\sqrt{1-x^2-y^2}}^{z=0} dz\,dy\,dx$

$x^2+y^2=1$

B) Cylindrical

$\int_0^{2\pi}\int_0^1\int_{z=-\sqrt{1-r^2}}^{z=0} r\,dz\,dr\,d\theta$

3. Describe and draw the surface: $0 \le \theta \le 2\pi$, $\frac{\pi}{2} \le \phi \le \pi$, and $\rho = 1$.



bottom ½ of sphere with radius 1