

Hw 7
Math 321

Some easy problems

1. Consider the cylinder with radius 2 and height 4. We use the cylindrical coordinate (ρ, θ, z) to parametrize it.
 - a). Find the ranges for ρ, θ, z
 - b). Find the volume element.
 - c). Evaluate the integral $\int_V z^2 dV$ where V is the volume inside the cylinder.
2. Consider the surface S of the cube $0 \leq x, y, z \leq 1$.
 - a). Calculate $\int_S (x^2 + 1) dS$
 - b). Let $d\vec{S}$ be the area element where we use the outer normal vector for the direction. Then calculate $\int_S \vec{r} \cdot d\vec{S}$

1.5

Do #1 again and compare the solutions here with your solutions to #1 in 1.6. Convince yourself that the two methods to finding the surface elements and volume elements are actually the same.

Do #2 #4 again.

1.6

Do #1, #2 #3 carefully and understand all of them.

Spend some time thinking about #4.

For #2, find the corresponding formula in Math222 (the polar coordinate) and see how we arrived at this same formula there.