

200 CAS notes for HW #6

Once you have set up an integral using cylindrical or spherical coordinates, you integrate just as you did for rectangular coordinates.

Below I use r for rho, t for theta, and p for phi.

```
syms r t p
int(int(int(t*r*r^2*sin(p),r,0,sqrt(2)),p,0,pi/4),t,0,2*pi)
```

$$\text{ans} = -\pi^2 (\sqrt{2} - 2)$$

Sometimes the exact answer has a function in it that you aren't familiar with.

```
syms x
int(exp(-x^2),x,0,1)
```

ans =

$$\frac{\sqrt{\pi} \operatorname{erf}(1)}{2}$$

We can get an estimate using the vpa command to n digits. Below I ask for four digits.

```
vpa(int(exp(-x^2),x,0,1),4)
```

ans = 0.7468