

Show all work. 5 points each.

1. Set up the triple integral in spherical coordinates where  $E$  is the region between the two spheres  $x^2 + y^2 + z^2 = 1$  and  $x^2 + y^2 + z^2 = 4$ .

$$\iiint_E z \, dV$$

2. Find the Jacobian of the transformation  $x = \frac{u}{u+v}$   $y = \frac{v}{u-v}$  .