4.18

1. Evaluate the triple integral. $\iiint_E 6xy\,dV$, where E lies under the plane $z = 1 + x + y$ and above the region in the xy-plane bounded by the curves $y = \sqrt{x}$, $y = 0$, and $x = 1$.

2. Sketch the solid whose volume is given by the iterated integral.

$$\int_0^1 \int_0^{1-x} \int_0^{2-2z} dy\,dz\,dx$$

3. Express the integral $\iiint_E f(x, y, z)\,dV$ as an iterated integral in six different ways, where E is the solid bounded by the the given surfaces.

$$y = x^2, z = 0, y + 2z = 4$$

4. Evaluate the integral by changing to cylindrical coordinates.

$$\int_{-3}^{3} \int_0^{\sqrt{9-x^2}} \int_0^{9-x^2-y^2} \sqrt{x^2 + y^2}\,dz\,dy\,dx$$

5. Find the volume of the solid that lies within both the cylinder $x^2 + y^2 = 1$ and the sphere $x^2 + y^2 + z^2 = 4$.