Annie's Survival Kit 3 - Math 324

1. (10 points) Set up a triple integral to find the volume of the region bounded by $z \le x^2 + y^2$, $x^2 + y^2 \le 3$ and $z \ge 0$ using **spherical coordinates**. (Recall that volume is $\int \int \int_R 1 \, dV$.) **Do not evaluate.**

2. (10 points) Switch $\int_0^{2\pi} \int_0^{\sqrt{3}} \int_2^3 zr^4 \, dz \, dr \, d\theta + \int_0^{2\pi} \int_{\sqrt{3}}^2 \int_2^{\sqrt{4-r^2}+2} zr^4 \, dz \, dr \, d\theta$ to spherical coordinates.

3. (10 points) Find the area of the ellipse $(2x + 5y - 7)^2 + (3x - 7y + 1)^2 \le 1$.