Worksheet January 24

1. Change $(1, \sqrt{3}, 2\sqrt{3})$ from rectangular to spherical coordinates.

2. Give inequalities in polar coordinates to describe the solid region lying outside the double cone $z^2 = x^2 + y^2$ and inside the sphere $x^2 + y^2 + z^2 = 4$.

- 3. A lamina occupies the part of the disk $x^2 + y^2 \leq 1$ in the first quadrant. The density at any point is proportional to the distance from the x-axis.
 - (a) Find the total mass. (Your answer will involve the constant of proportionality.)

(b) Find the *x*-coordinate of the center of mass.