

Section 15.8: Additional Problems

1. Convert these equations to spherical coordinates.

(a) $z = \sqrt{5x^2 + 5y^2}$

(b) $z = -\sqrt{7x^2 + 7y^2}$

2. Convert the integral to spherical.

$$\int_0^{1.5} \int_{x\sqrt{3}}^{\sqrt{9-x^2}} \int_{-\sqrt{36-x^2-y^2}}^{-\sqrt{3x^2+3y^2}} z \sqrt{x^2 + y^2 + z^2} \, dz dy dx$$

3. Set up the integral, in spherical, to find the volume of the region that is inside a sphere (centered at the origin) of radius 4 and below the plane $z = -2$.
4. Set up the integral, in spherical, to find the volume of the region that is inside a sphere (centered at the origin) of radius 4 and above the plane $z = -2$. **Note: be very careful with this problem.**