Example 1. Find the rectangular coordinates of the point $P$ with spherical coordinates $(2, \frac{\pi}{3}, \frac{\pi}{4})$.

Example 2. Find spherical coordinates of the point with rectangular coordinates $(1, \sqrt{3}, 2)$.

Example 3. Describe the surface with equation in spherical coordinates is $\rho = 3$.

Example 4. Describe the surface with equation in spherical coordinates is $\theta = \pi/4$.

Example 5. Describe the surface with equation in spherical coordinates is (1) $\phi = \pi/4$. (2) $\phi = 3\pi/4$.

Example 6. Evaluate $\iiint_B 3e^{(x^2+y^2+z^2)^{3/2}}\, dV$, where $B$ is the ball

$$B = \{(x, y, z) \mid x^2 + y^2 + z^2 \leq 1\}$$

Example 7. Evaluate $\iiint_E 1\, dV$, where $E$ is the region above the cone $z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = z$.

Example 8. Evaluate $\iiint_E (4 - x^2 - y^2)\, dV$, where $B$ is the top half ball

$$B = \{(x, y, z) \mid x^2 + y^2 + z^2 \leq 1, \ z \geq 0\}$$