Find the volumes of the solids described below.

1. The solid that lies inside the sphere $x^2 + y^2 + z^2 = 16$ and outside the cylinder $x^2 + y^2 = 4$

2. The solid that lies above the cone $z = \sqrt{x^2 + y^2}$ and below the sphere $x^2 + y^2 + z^2 = 8$

3. The solid that lies under the upper hemisphere $z = \sqrt{25 - x^2 - y^2}$ and above the circle $x^2 + y^2 = 5x$ in the xy-plane

4. The solid that lies under the surface $f(x, y) = \dfrac{1}{2\pi} e^{\frac{-x^2-y^2}{2}}$ and above the circle of radius k in the xy-plane that is centered at the origin.