Problem statement A cylinder is inscribed inside a sphere of radius $R$ (an inscribed cylinder is shown in the picture to the right). Suppose the height of the cylinder is $x$. Write a formula for the volume, $V(x)$, of the cylinder as a function of $x$. (This formula will also include $R$ in some way.) Information about the domain of $V(x)$ should be part of the explanation. Graph $V(x)$ when $R = 3$.

Comment Label the picture and analyze it carefully.