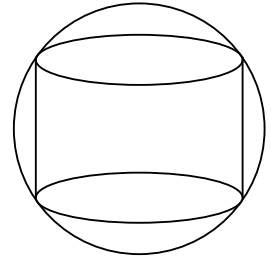


**Problem statement** A cylinder is inscribed inside a sphere of radius  $R$  (an inscribed cylinder is shown in the picture to the right). Suppose the height of the cylinder is  $x$ . Write a formula for the volume,  $V(x)$ , of the cylinder as a function of  $x$ . (This formula will also include  $R$  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.