

Find the volume of each three dimensional object described below.

1. The solid formed when the region bounded by  $y = x^2 + 1$  and  $y = x + 3$  is rotated about the  $x$ -axis
2. The volume when the region from #1 is rotated about the line  $y = 12$
3. The sphere of radius  $r$   
*Hint:* The circle of radius  $r$  is described by  $x^2 + y^2 = r^2$