Find the volume of each three dimensional object described below.

1. The solid formed when the region bounded by $y = x^2 + 1$ and $y = -3x^2 + 9$ is rotated about the x-axis

2. The sphere of radius r
   Hint: The circle of radius r is described by $x^2 + y^2 = r^2$

3. The volume when the region from #1 is rotated about the line $y = 12$

4. The solid formed when the region bounded by the parabola $y = -x^2 + 8x - 15$ and the x-axis is rotated about the y-axis.

   Hint: $-x^2 + 8x - 15 = -(x - 4)^2 + 1$