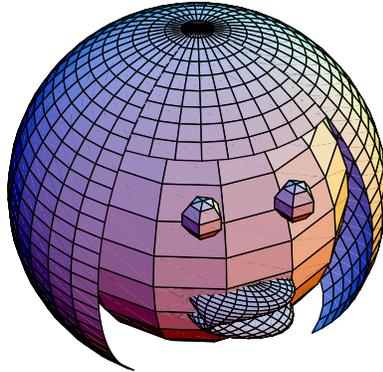Oliver had a haircut. His head is a sphere of radius 10. His machine cuts all hair in a distance of 1 from the skull. His hair is in the range

$$0 \le \theta \le \frac{3\pi}{2}, 0 \le \phi \le \frac{3\pi}{4}$$

as well as (still)

$$\frac{3\pi}{2} \le \theta \le 2\pi, 0 \le \phi \le \frac{\pi}{4} \ .$$

What volume of hair was cut away?

Space for work:

Note: $11^3 = 1331$