

ZMATH 2013a.00597**Pippenger, Nicholas****Two extensions of results of Archimedes.**

Am. Math. Mon. 118, No. 1, 66-71 (2011).

Let us consider the following bodies: indent=4mm

- X is a filled right circular cylinder of radius 1 about the x -axis.
- Y is a similar cylinder about the y -axis.
- Z is a similar cylinder about the z -axis.
- $R = X \cap Y$ and $S = X \cap Y \cap Z$.
- U is the filled right isosceles triangular cylinder with side 1 given by the inequalities $z \geq 0$, $z \leq y$ and $y \leq 1$.
- $H = U \cap Z$ (the so-called "hoof").
- V is the filled right isosceles triangular cylinder with side 1 given by the inequalities $z \geq 0$, $z \leq x$ and $x \leq 1$.
- $J = U \cap V \cap Z$. In this paper the author uses Cavalieri's principle to compute rigorously the following volumes: indent=6mm

(1) $\text{vol}(R) = 16/3$.

(2) $\text{vol}(S) = 16 - 8\sqrt{2}$.

(3) $\text{vol}(H) = 2/3$.

(4) $\text{vol}(J) = (2 - \sqrt{2})/3$. Bodies R and H both appear in Archimedes' method where, obviously, different techniques are used to compute their volume. The volume of S and H are presented here as generalizations of the previous ones using Cavalieri's principle.

*Antonio M. Oller (Zaragoza)**Classification:* G40*Keywords:* method of Archimedes; Cavalieri's principle; intersection of cylinders; hoof

doi:10.4169/amer.math.monthly.118.01.066