

Spheres Inscribed Within a Ring Torus

Alcaarez, Dave Matthew (School: Ormoc City Senior High School)

Ascura, Alex Huan Karl (School: Ormoc City Senior High School)

Lambonao III, Benedicto (School: Ormoc City Senior High School)

This study aimed to develop a theorem that algebraically calculates the maximum number of spheres inscribed within a ring torus and its resulting total volume. A ring torus is a circle with radius (r) rotated around an external axis. Defined as a "donut," it is measured through its major (R) and minor (r) radii, where ($0 < r < R$). Moreover, the inscribed sphere is a sphere with radius (r) inside the tube of the ring torus. To date, there is no way to algebraically calculate the maximum number of spheres inscribed within a ring torus, (n). Thus, the researchers derived a theorem for (n) being $n = \frac{\pi}{\sin^{-1}(r/R)}$, and its resulting total volume, $V = (\frac{\pi}{\sin^{-1}(r/R)})(\frac{4\pi r^3}{3})$. This research may be used in various fields of pure mathematics. Moreover, these findings may have practical applications in materials science and engineering.

Awards Won: