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SYNOPSIS

Divisibility tests have long fascinated mathematicians and mathematics students. Tests for divisibility by 2, 3, 5, 9, and 11, for example, are very familiar and are based on modular arithmetic. The history of mathematics has recorded many efforts to devise tests for divisibility by other positive integers, especially primes. This paper studies cycles of residues generated by repeating tests for divisibility by a prime, and shows relationships between the cycles and aspects of group theory from abstract algebra.

Enjoy!

This month's "free sample" is:

3141. *Proposé par José Luis Díaz-Barrero, Université Polytechnique de Catalogne, Barcelone, Espagne.*

Soit a, b et c les côtés d'un triangle scalène ABC. Montrer que

$$\sum_{\text{cyclique}} \frac{(a+1)bc}{(\sqrt{a}-\sqrt{b})(\sqrt{a}-\sqrt{c})} < \frac{a^4+b^4+c^4}{abc}\,.$$

. . . .

3141. *Proposed by José Luis Díaz-Barrero, Universitat Politècnica de Catalunya, Barcelona, Spain.*

Let a, b, and c be the sides of a scalene triangle ABC. Prove that

$$\sum_{\text{cyclic}} \frac{(a+1)bc}{(\sqrt{a}-\sqrt{b})(\sqrt{a}-\sqrt{c})} < \frac{a^4+b^4+c^4}{abc}\,.$$