MathemAttic

No. 68

The problems in this section are intended for students at the secondary school level.

Click here to submit solutions, comments and generalizations to any problem in this section.

To facilitate their consideration, solutions should be received by **December 15, 2025**.

MA336. *Proposed by Michael Friday.*

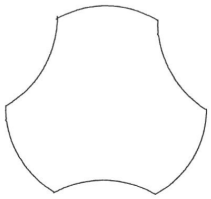
Suppose that in triangle ABC we have $\angle A - \angle B = 90°$. Prove that the orthic triangle of ABC, which is the triangle formed by the feet of the altitudes of ABC, is isosceles.

MA337. *Proposed by Alaric Pow.*

Prove or disprove that there cannot be a right-angled triangle whose sides are all of prime length.

MA338.

A *hexle* is constructed from a circle by reversing three non-intersecting arcs, each of which is 1/6 of the circumference. If the radius of the circle is 1, find the exact area of the hexle.



MA339.

If p and q are positive integers such that

$$\frac{p}{q} = 1 + \frac{1}{2} - \frac{2}{3} + \frac{1}{4} + \frac{1}{5} - \frac{2}{6} + \frac{1}{7} + \frac{1}{8} - \frac{2}{9} + \cdots + \frac{1}{478} + \frac{1}{479} - \frac{2}{480},$$

show that p is divisible by 641.

MA340.

Suppose that m and n are positive integers. For what values of m and n can $m^4 + 4n^4$ be a prime number?