3298. *Proposed by Stanley Rabinowitz, MathPro Press, Chelmsford, MA, USA.*

Let ABC be a triangle of area $\frac{1}{2}$ in which a is the length of the side opposite vertex A. Prove that

$$a^2 + \csc A \;\geq\; \sqrt{5}\,.$$

[*Ed.:* The proposer's only proof of this is by computer. He is hoping that some ***CRUX with MAYHEM*** reader will find a simpler solution.]

3299. *Proposed by Victor Oxman, Western Galilee College, Israel.*

Given positive real numbers a, b, and w_b, show that

(a) if a triangle ABC exists with $BC = a$, $CA = b$, and the length of the interior bisector of angle B equal to w_b, then it is unique up to isomorphism;

(b) for the existence of such a triangle in (a), it is necessary and sufficient that

$$b \;>\; \frac{2a\,|a - w_b|}{2a - w_b} \;\geq\; 0\,;$$

(c) if h_a is the length of the altitude to side BC in such a triangle in (a), we have $b > |a - w_b| + \frac{1}{2}h_a$.

3300. *Proposed by Arkady Alt, San Jose, CA, USA.*

Let a, b, and c be positive real numbers. For any positive integer n define

$$F_n \;=\; \left(\frac{3(a^n + b^n + c^n)}{a+b+c} - \sum_{\text{cyclic}} \frac{b^n + c^n}{b+c}\right)\,.$$

(a) Prove that $F_n \geq 0$ for $n \leq 5$.

(b)★ Prove or disprove that $F_n \geq 0$ for $n \geq 6$.