

Problems

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This section of the Journal offers readers an opportunity to exchange interesting mathematical problems and solutions. Please send them to Ted Eisenberg, Department of Mathematics, Ben-Gurion University, Beer-Sheva, Israel or fax to: 972-86-477-648. Questions concerning proposals and/or solutions can be sent e-mail to <eisenbt@013.net>. Solutions to previously stated problems can be seen at <<http://www.ssma.org/publications>>.

*Solutions to the problems stated in this issue should be posted before
May 15, 2015*

- **5343:** *Proposed by Kenneth Korbin, New York, NY*

Four different Pythagorean Triangles each have hypotenuse equal to $4p^4 + 1$ where p is prime.

Express the sides of these triangles in terms of p .

- **5344:** *Proposed by Y. N. Aliyev, Qafqaz University, Khyrdalan, Azerbaijan*

Let $\triangle ABC$ be isosceles with $AB = AC$. Let D be a point on side BC . A line through point D intersects rays AB and AC at points E and F respectively. Prove that $ED \cdot DF \geq BD \cdot DC$.

- **5345:** *Proposed by Arkady Alt, San Jose, CA*

Let $a, b > 0$. Prove that for any x, y the following inequality holds

$$|a \cos x + b \cos y| \leq \sqrt{a^2 + b^2 + 2ab \cos(x + y)},$$

and find when equality occurs.

- **5346:** *Proposed by D.M. Bătinetu-Giurgiu, "Matei Basarab" National College, Bucharest, Romania and Neculai Stanciu, "George Emil Palade" School, Buzău, Romania*

Show that in any triangle ABC , with the usual notations, the following hold,

$$\frac{h_b + h_c}{h_a} r_a^2 + \frac{h_c + h_a}{h_b} r_b^2 + \frac{h_a + h_b}{h_c} r_c^2 \geq 2s^2,$$

where r_a is the excircle tangent to side a of the triangle and s is the triangle's semiperimeter.

- **5347:** *Proposed by José Luis Díaz-Barrero, Barcelona Tech, Barcelona, Spain*

Let $0 < a < b$ be real numbers and let $f, g : [a, b] \rightarrow \mathbb{R}_+^*$ be continuous functions. Prove