Problems

Ted Eisenberg, Section Editor

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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
March 15, 2016

- **5379:** *Proposed by Kenneth Korbin, New York, NY*

  Solve:
  $$\frac{(x+1)^4}{(x-1)^2} = 17x.$$

- **5380:** *Proposed by Arkady Alt, San Jose, CA*

  Let $\Delta(x,y,z) = 2(xy+yz+xz) - (x^2+y^2+z^2)$ and a,b,c be the side-lengths of a triangle ABC. Prove that
  $$F^2 \geq \frac{3}{16} \cdot \frac{\Delta(a^3,b^3,c^3)}{\Delta(a,b,c)},$$
  where F is the area of $\triangle ABC$.

- **5381:** *Proposed by D.M. Batinetu-Giurgiu, "Matei Basarab" National College, Bucharest, and Neculai Stanciu "George Emil Palade" School, Buzău, Romania*

  Prove: In any acute triangle ABC, with the usual notations, holds:
  $$\sum_{cyclic} \left(\frac{\cos A \cos B}{\cos C}\right)^{m+1} \geq \frac{3}{2^{m+1}},$$
  where $m \geq 0$ is an integer number.

- **5382:** *Proposed by* Ángel Plaza, University of Las Palmas de Gran Canaria, Spain

  Prove that if a,b,c are positive real numbers, then
  $$\left(\sum_{cyclic} \frac{a}{b} + 8\sum_{cyclic} \frac{b}{a}\right)\left(\sum_{cyclic} \frac{b}{a} + 8\sum_{cyclic} \frac{a}{b}\right) \geq 9^3.$$

- **5383:** *Proposed by José Luis Díaz-Barrero, Barcelona Tech, Barcelona, Spain*