

Problems

Ted Eisenberg, Section Editor

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
April 15, 2017*

- **5433:** *Proposed by Kenneth Korbin, New York, NY*

Solve the equation: $\sqrt[4]{x+x^2} = \sqrt[4]{x} + \sqrt[4]{x-x^2}$, with $x > 0$.

- **5434:** *Proposed by Titu Zvonaru, Comnesti, Romania and Neculai Stanciu, "George Emil Palade" General School, Buzău, Romania*

Calculate, without using a calculator or log tables, the number of digits in the base 10 expansion of 2^{96} .

- **5435:** *Proposed by Valcho Milchev, Petko Rachov Slaveikov Secondary School, Bulgaria*

Find all positive integers a and b for which $\frac{a^4 + 3a^2 + 1}{ab - 1}$ is a positive integer.

- **5436:** *Proposed by Arkady Alt, San Jose, CA*

Find all values of the parameter t for which the system of inequalities

$$\mathbf{A} = \begin{cases} \sqrt[4]{x+t} \geq 2y \\ \sqrt[4]{y+t} \geq 2z \\ \sqrt[4]{z+t} \geq 2x \end{cases}$$

- a) has solutions;
- b) has a unique solution.

- **5437:** *Proposed by José Luis Díaz-Barrero, Barcelona Tech, Barcelona, Spain*

Let $f : C - \{2\} \rightarrow C$ be the function defined by $f(z) = \frac{2-3z}{z-2}$. If $f^n(z) = \underbrace{(f \circ f \circ \dots \circ f)}_n(z)$, then compute $f^n(z)$ and $\lim_{n \rightarrow +\infty} f^n(z)$.

- **5438:** *Proposed by Ovidiu Furdui, Technical University of Cluj-Napoca, Cluj-Napoca, Romania*