PROBLEMS AND SOLUTIONS

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This section contains problems intended to challenge students and teachers of college mathematics. We urge you to participate actively *both* by submitting solutions and by proposing problems that are new and interesting. To promote variety, the editors welcome problem proposals that span the entire undergraduate curriculum.

Proposed problems should be sent to **Jerzy Wojdylo**, either by email (preferred) as a pdf, TEX, or Word attachment or by mail to the address provided above. Whenever possible, a proposed problem should be accompanied by a solution, appropriate references, and any other material that would be helpful to the editors. Proposers should submit problems only if the proposed problem is not under consideration by another journal.

Solutions to the problems in this issue should be sent to **Chip Curtis**, either by email as a pdf, TEX, or Word attachment (preferred) or by mail to the address provided above, no later than June 15, 2017.

PROBLEMS

1111. *Proposed by Greg Oman, University of Colorado, Colorado Springs, CO.*

Let $\sum_{n=0}^{\infty} x_n$ be a real convergent series with positive terms. Prove that there is a subsequence $\{x_{n_k}\}$ of $\{x_n\}$ such that $\sum_{k=0}^{\infty} x_{n_k}$ is irrational.

1112. *Proposed by Ovidiu Furdui, Technical University of Cluj-Napoca, Cluj-Napoca, Romania.*

Prove the following statements are equivalent for a real 2×2 matrix A.

(a) $\cosh A$ is singular.

(b) $\cosh A = 0_2$ (the 2×2 zero matrix).

(c) $A = P \begin{pmatrix} 0 & \frac{(2m-1)\pi}{2} \\ \frac{-(2m-1)\pi}{2} & 0 \end{pmatrix} P^{-1}$ for some integer m and some real invertible matrix P.

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