SOLUTIONS

No problem is ever permanently closed. Any comments, new solutions, or new insights on old problems are always welcomed by the problem editor.

47. [1992, 88; 1993, 94] *Proposed by Russell Euler, Northwest Missouri State University, Maryville, Missouri.*

Find all the solutions of

$$(x-1)x(x+1)(x+2) = -1.$$

Comment by the editor.

Due to an error by the editor, a remark by the proposer was omitted from the solution to the problem. At the time the problem was proposed, the proposer noted that if x is an integer, the factorization provided in the solution indicates that the product of four consecutive integers is one less than the square of an integer.

57. [1993, 90] *Proposed by Mohammad K. Azarian, University of Evansville, Evansville, Indiana.*

Let s and k be positive integers. Evaluate

$$\lim_{n\to\infty} \prod_{i=1}^{k} \sum_{j=1}^{n} j^i \left(\frac{s}{n}\right)^{i+1}.$$

Solution I by Joseph E. Chance, University of Texas-Pan American, Edinburg, Texas; Seung-Jin Bang, Albany, California; and the proposer.

$$\sum_{j=1}^{n} j^i \left(\frac{s}{n}\right)^{i+1} = \sum_{j=1}^{n} \left(\frac{js}{n}\right)^i \frac{s}{n}$$

is an upper Riemann sum for

$$\int_0^s x^i dx.$$

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