PROBLEMS

Problems, solutions, and any comments on the problems or solutions should be sent to the problem editor, whose address appears on the inside back cover. An asterisk $(*)$ after a number indicates a problem submitted without a solution.

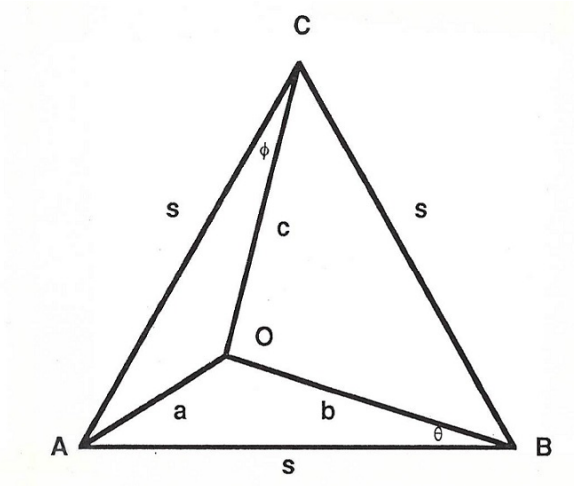
Problems which are new or interesting old problems which are not well-known may be submitted. They may range from challenging high school math problems to problems from advanced undergraduate or graduate mathematics courses. It is hoped that a wide variety of topics and difficulty levels will encourage a number of readers to actively participate in problems and solutions.

Problems and solutions should be typed or neatly printed on separate sheets of paper. They should include the name of the contributor and the affiliation. Solutions to problems in this issue should be mailed no later than September 30, 1991, although solutions received after that date will also be considered until the time when a solution is published.

Problem 28 has been reprinted from the last issue of the **MJMS** because the figure was included on a page insert.

28. *Proposed by Russell Euler, Northwest Missouri State University, Maryville, Missouri.*

Let ABC be an equilateral triangle with segment lengths as indicated in the diagram. Determine s as a function of a, b and c.



29. *Proposed by Jayanthi Ganapathy, University of Wisconsin-Oshkosh, Oshkosh, WI.*

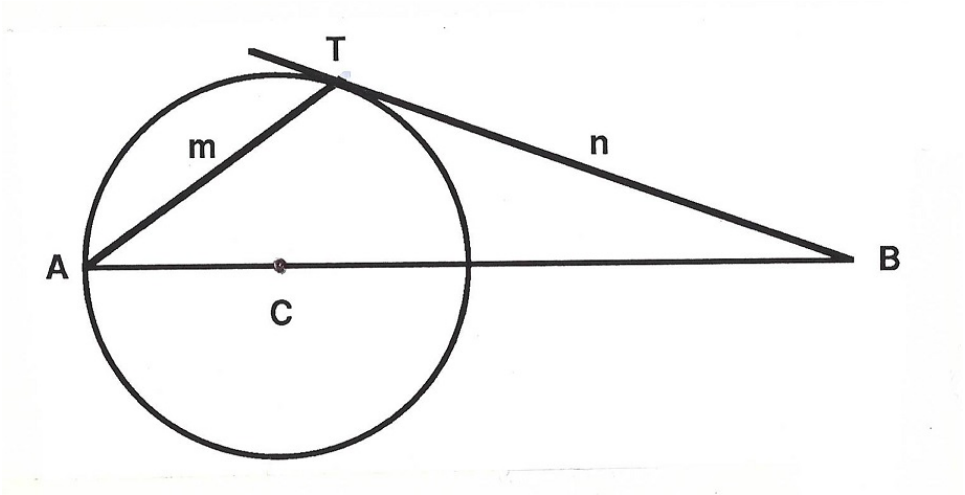
Define a sequence of real numbers $\{a_n\}_{n=1}^{\infty}$ as follows:

$$a_1 = 5 \ .$$
$$a_n = \sqrt{a_{n-1} + \sqrt{2a_{n-1}}}, \quad \text{for} \quad n \geq 2 \ .$$

Does $\{a_n\}$ converge and if so, to what?

30. *Proposed by Russell Euler, Northwest Missouri State University, Maryville, Missouri.*

In the diagram below, C is the center of a circle of radius r, T is a point of tangency, $AT = m$ and $BT = n$. Determine r as a function of m and n.



31. *Proposed by Troy L. Hicks, University of Missouri-Rolla, Rolla, Missouri.*

Put a topology t on $X = [0, 1]$ such that:
(a) (X, t) is an H-closed space, and
(b) (X, t) has a countable open cover such that no proper subfamily covers X.
(c) every open cover has a finite subcollection whose closures cover.

Reference.

1. S. Willard, *General Topology*, Addison-Wesley, 1970.

Comments. A Hausdorff space is H-closed if it is closed in every Hausdorff space in which it can be embedded. This generalizes a property of compact Hausdorff spaces. In [1], an example is given of an H-closed space X that is not compact. Also, it is noted that a Hausdorff space is H-closed iff every open cover has a finite subcollection whose closures cover.

32. *Proposed by Curtis Cooper and Robert E. Kennedy, Central Missouri State University, Warrensburg, Missouri.*

Let

$$g(x) = \frac{45x + 1991}{x + 45} \ .$$

Evaluate

$$\lim_{k\to\infty} \underbrace{g(g(\cdots(g}_{k}(0))\cdots)) \ .$$