

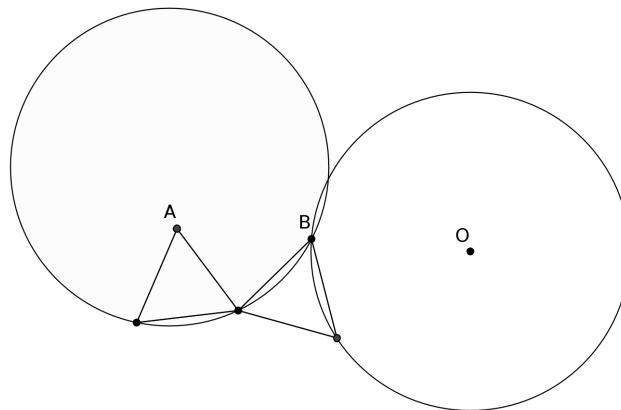
# Problems of the Month

University of Louisiana at Lafayette

April, 2016

*Solutions must be submitted by 05/15/2016. They can be emailed or handed in to Calvin Berry (cberry@louisiana.edu) or Leonel Robert (lrobert@louisiana.edu).*

1. The triangles in the figure are equilateral. The circles have the same radius. The point  $O$  is the center of the circle on the right. Show that the points  $A$ ,  $B$ , and  $O$  are on a line.



2. Let

$$\sum_{n=1}^{\infty} a_n$$

be a series of real numbers that is conditionally convergent but not absolutely convergent. Show that the numbers  $a_1, a_2, \dots$  can be arranged in an infinite array

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.	.	.	...
⋮	⋮	⋮	⋱

such that every row sum is zero and every column sum is zero.

3. Three balanced dice are rolled. If no two dice show the same face, what is the probability that one is an ace? Note: rolling an ace means rolling a one. Extend this result to cover the cases  $n = 1, 2, \dots, 6$ . That is, find  $p_n$  the conditional probability that an ace is observed given that no two dice show the same face, when  $n$  dice are rolled.