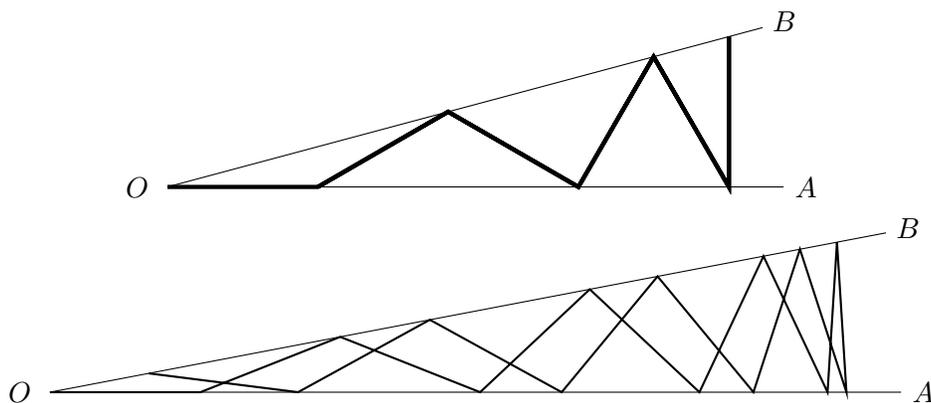


Mathematics Competition

Problem #5 of five - November 15 to December 6, 2013

Angle $\angle AOB$ with measure α is shown below. A grasshopper starts at vertex O , always jumps distance 1, always jumps from one leg of the angle to the other, and never returns the way it just came. If there is no possible jump, the grasshopper stops. The first example below shows a grasshopper that does six jumps and must stop, and the second example shows a case with more jumps that end close to O . Find an angle α that causes the grasshopper to stop at O after 2013 jumps. Explain your solution.



Direct any questions to Gregory Galperin, OM 3361, or Keith Wolcott, OM 3341

Rules and Awards

- Any undergraduate currently enrolled at EIU is eligible to participate.
- Each solution is to be the work of one individual and is to be submitted with the solver's name, year in school, email address, local address and home address.
- Each solution is to be written or typed and is due in the main Mathematics Department office (OM3611) by **2:00 p. m., Friday, December 6.**
- Entries will be judged on the basis of clarity of exposition and elegance of solution.
- Up to \$40 will be distributed as prize money for each problem. It will be distributed based on the quality of the solutions, but roughly, an award of \$10 will be awarded for the best solutions and \$5 will be awarded for partial solutions. In the case that there are many correct solutions, we will have a drawing for the prizes and in case no award is made, the prize money will be added to the next problem's prize fund.
- **Challenges, solutions, names of all solvers, and comments will be posted on the Challenge of the Week homepage:**

<http://www.eiu.edu/math/challenge.php>