University Math Challenge

February 7^{th}, 2025 to February 28^{th}, 2025

PROBLEM # 1

(1) If the triangle T is an acute triangle, is it possible to dissect T into two triangles, so that both of the triangles are obtuse? Explain your answer.

(2) If the triangle T is a right triangle, is it possible to dissect T into two triangles, so that both of the triangles are obtuse? Explain your answer.

(3) If the triangle T is an obtuse triangle, is it possible to dissect T into two triangles, so that both of the triangles are obtuse? Explain your answer.

(4) Is there a parallelogram P so that each of its diagonals dissects P into two triangles, both of which are obtuse? Give an example, or explain why no such parallelogram can exist.

Direct any questions to
Grant Lakeland (OM 3226)

Rules & Rewards

- 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 (OM 3611) by 2:00pm, Friday, February 28^{th}, 2025.
- Entries will be judged on the basis of clarity of exposition and elegance of the solution. That is to say, the *explanation* is more important than the answer.
- An award of $50 will be given for the best solution. In the case of a two-way tie, the award will be evenly split. If there are more than two 'best' solutions, a drawing will be held for the reward. In the case no award is made for this week's challenge, $50 will be added to the next week's award.
- Names of all solvers will be posted on the Challenge of the Month bulletin board and on the Challenge homepage: `http://www.eiu.edu/math/challenge.php`