University Math Challenge

March 6, 2026 to April 3, 2026

PROBLEM # 2

Suppose that we have a set $\mathcal{A}$ of 10 points in the plane, that no three of the points are collinear, and that none of the lines through two points of $\mathcal{A}$ are parallel.

(1) Explain why there must be a pair of lines, each through a pair of points of $\mathcal{A}$, which meet at an angle no greater than $10°$.

(2) Must it be possible to find three triangles, each with vertices among the points of $\mathcal{A}$, so that each triangle's vertices are distinct from the vertices of the other triangles, and the triangles do not overlap in any way? Explain your answer.

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, April 3, 2026.
- 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`