Challenge of the Week

The plane is colored in two colors, white (W) and red (R). This means that every single point in the plane is either white or red. A segment in the plane is called "*good*" if both its ends have the same color. There are two types of good segments: if both ends of a good segment are white, we call this segment a "*good* **white** *segment*"; otherwise we call it a "*good* **red** *segment*".

1. Prove that there is a good segment (white or red) of length 2015 miles.

2. Prove that there are infinitely many non-intersecting good segments of the **same** color, each of which has length 2015 miles.

3. Prove that there are infinitely many non-intersecting **pairwise parallel** good segments of the **same** color, each of which has a length of 2015 miles.

Direct any questions to Gregory Galperin, OM 3361.

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, October 2, 2015.

- Entries will be judged on the basis of clarity of exposition and elegance of solution. That is to say, the *explanation* is more important than the answer.

- An Award of $25 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 challenge, $25 will be added to the next challenge.

- 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.