

## E7. Rectangles in a Colored Plane

### Inspired by Problems 8.5(A), 8.5(B)

The result of problem 8.5(A) was improved in problem 8.5(B). Can we strengthen it further? How much further? It is an open problem. In [S5] I offered a \$25 prize for the first solution of this problem. It is still unclaimed in 2010.

**Open Problem E7.9.** Find the minimum  $N$  such that no matter how the plane is colored in 2 colors, it contains a monochromatic  $m \times n$  rectangle, such that  $m = 1$  or  $2$ , and  $n$  is a positive integer not greater than  $N$ .

Problem 8.5(B) shows that  $N \leq 5$ .

I observed the following relationship:

**E7.2** Prove that the positive answer to Open Problem E6.8 implies that  $N \leq 4$ .