Math 101 Homework

Mary Radcliffe

due 22 Feb2015

Answer the following questions. Fully justify each response.

- 1. Prove that Soifer's irregular octagon and square tiling discussed in class has the property that no octagon color realizes distance $\sqrt{5}$, and the square color does not realize distance 1.
- 2. Consider the following definition. Define χ_t to be the smallest k such that there is a coloring of \mathbb{R}^2 using k colors, having the property that every color set realizes every distance. Is this a meaningful constant? Find its value.
- 3. Consider the following definition. Define χ_f to be the maximal k such that there is a coloring of \mathbb{R}^2 using k colors, having the property that every color set realizes every distance. Is this a meaningful constant? Find its value.