

Handout 7: More Mutually Orthogonal Latin Squares

*Week 4**UCSB 2014*

This is due **Friday, Jan. 31**.

1. Prove the following proposition: For any n , the maximum number of squares in a collection of $n \times n$ mutually orthogonal Latin squares is $n - 1$.
2. Prove the following proposition: for any prime p , there is a collection of $p - 1$ mutually orthogonal $p \times p$ Latin squares.

(Hint: take $\mathbb{Z}/p\mathbb{Z}$. For each $a \in \mathbb{Z}/p\mathbb{Z}$, look at the collection of all lines of slope a . Can you turn this collection into a Latin square somehow?)

Bonus! Is hard. Is there a set of two 6×6 mutually orthogonal Latin squares?