

math123, Abstract Algebra II

PROBLEM SET 1

- Exercise 7.1.1 from Artin's book
- Exercise 7.1.4
- Exercise 7.2.5
- Exercise 7.2.7
- Exercise 7.2.9
- Exercise 7.2.10
- Exercise 7.2.18
- Exercise 7.4.2
- Exercise 7.4.5
- Exercise 7.4.16
- Exercise 7.5.4
- Exercise:
Determine the maximal value of $k \in \mathbb{Z}_+$ such that there exists a collection of vectors $S = \{X_1, \dots, X_k\} \subset \mathbb{R}^n$ with the property that:

$$X_i \cdot X_j < 0, \quad \forall i \neq j$$

(**Hint:** use induction on n and orthogonal projections)