

HOMEWORK 7.

Due Monday, November 7, in class.

1. Let $A \in M_{n \times n}(\mathbb{Q})$. Prove or disprove:

- (a) The sum of all eigenvalues of A must be a rational number.
- (b) The product of all eigenvalues of A must be a rational number.

2. Let σ be a permutation of integers $\{1, 2, \dots, n\}$. If $x = (a_1, a_2, \dots, a_n)$ is a vector in \mathbb{F}^n we define $Ax = (a_{\sigma(1)}, a_{\sigma(2)}, \dots, a_{\sigma(n)})$. Find the eigenvalues of A .

3. Do Problem 17 in Section 5.1.

4. Do Problem 6 (d) in Section 5.4.

5. Do Problem 42 in Section 5.4.