

MATH 173, FALL2022, HOMEWORK #11

ALEX IOSEVICH

1. PROBLEMS NOT FROM THE BOOK

Problem #1: Let p be a positive prime number. Prove that for any $a \in \{1, 2, \dots, p-1\}$ there exists $b \in \{1, 2, \dots, p-1\}$ such that $ab - 1$ is a multiple of p . This is the main step in showing that integers modulo a prime is a field.

Hint: Consider $a, 2a, \dots, (p-1)a$. Prove that the difference of no two numbers on this list is a multiple of p . Draw suitable conclusions from this observation.

2. PROBLEMS FROM THE BOOK

Section 3.6, problems 1,2,3

Section 3.7, problems 1,2,3,4,5,6