

Homework 4

MATH 301

This assignment will not be collected, but the content is eligible for questions on Exam 1.

Instructions. Read the [Homework Guide](#) to make sure you understand how to successfully complete the assignment. All claims must be sufficiently justified.

Exercise 1. Let $n \in \mathbb{N}$ with $n > 1$, and let $a \in \mathbb{Z}$ be relatively prime to n . Prove that if $b \in \mathbb{Z}$ such that $b = a \pmod{n}$, then b is relatively prime to n .

Definition. The *group of units of \mathbb{Z}_n* is the set $U(n) = \{a \in \mathbb{Z}_n : a \text{ is relatively prime to } n\}$ equipped with multiplication modulo n (note this definition makes sense by Exercise 1). This group will appear in some of the exercises from the book.

Exercise 2. Complete the following exercises from [Section 3.5](#) in the course textbook:

2, 6, 7, 15, 26, 31, 32