Math 403B: Introduction to Modern Algebra, Winter Quarter 2018
Jarod Alper
Homework 2
Due: Monday, January 22

Problem 2.1. Judson 16.6.1

Problem 2.2. Judson 16.6.3

Problem 2.3. Suppose R is a ring with exactly t distinct unit elements.
(a) Prove that every unit u satisfies $u^t = 1$.
(b) Deduce Euler's theorem: if n and a are relatively prime positive integers, then
$$a^{\varphi(n)} \equiv 1 \mod n$$
where $\varphi(n)$ is the number of relatively positive integers less than n relatively prime to n.

Problem 2.4. Goodman 1.11.9

Problem 2.5. Goodman 1.11.11

Problem 2.6. Judson 16.6.4

Problem 2.7. Judson 16.6.5

Problem 2.8. Judson 16.6.7

Problem 2.9. Judson 16.6.8

Problem 2.10. Judson 16.6.9

Problem 2.11. Judson 16.6.11

Problem 2.12. Find all the units in $\mathbb{Z}[i]$.