

Math 456

Homework # 7 - Prime and Maximal Ideals

1. Find all the maximal ideals of \mathbb{Z}_6 . Which ones are prime?
2. Find all the maximal ideals of \mathbb{Z}_8 . Which ones are prime?
3. Find all the maximal and prime ideals of $\mathbb{Z}_2 \times \mathbb{Z}_2$.
4. Is $6\mathbb{Z}$ a maximal ideal of \mathbb{Z} ? Is it prime?
5. Let R be an integral domain. Show that $\{0\}$ is a prime ideal of R .
6. Let R be a commutative ring with multiplicative identity $1 \neq 0$. Let I be an ideal of R . Prove the following: If I is maximal, then I is prime.
7. Give an example of a prime ideal I in a ring R that is not maximal.