

Math 614 Quiz 4

YOU MAY USE THEOREMS FROM THE PREVIOUS WORKSHEETS; PLEASE BE CLEAR ABOUT WHAT YOU USE.

Let \mathcal{X} be an arbitrary non-empty set, and let \mathcal{R} be the ring of *all functions* from \mathcal{X} to \mathbb{F}_3 .

- (1) Demonstrate that \mathcal{R} is an \mathbb{F}_3 -algebra.
- (2) Prove that \mathcal{R} is an **integral extension** of \mathbb{F}_3 .
- (3) Prove that every prime ideal of \mathcal{R} is maximal.
- (4) Compute the Krull dimension of \mathcal{R} .