Chapter 3 test things to know:

How to prove basic properties of rings and fields. For example: Theorems 3.3, 3.4, 3.5, Homework problems 3.2 # 5, 15, 17, 21, 22

How to prove basic properties of functions (in particular isomorphisms). For example: Theorem 3.10, Homework problem 3.2 # 27.

How to prove a given set with operations is a ring, field or integral domain. In particular, you might be given an example that is:

- A well known set with a new addition or multiplication (see 3.1 # 22-26)
- A subset of $M(\mathbb{R})$
- A subset of $\mathbb{R}$ or $\mathbb{C}$ (such as the even integers or $\mathbb{Q}(\sqrt{2})$)
- $\mathbb{Z}_n$ or a subset of $\mathbb{Z}_n$

And you might be asked:

- What properties of being a ring do you automatically know are true (because of the way the set and/or operations are defined)
- Prove a particular axiom is satisfied (I will tell you to show that the set with the operations given satisfies property ____. You will not need to know which number goes with which property.)

How to prove a given function is or is not an isomorphism/homomorphism.
Given a function you might be asked to prove:

- it is a well-defined function
- it is 1-1
- it is onto
- it preserves addition
- it preserves multiplication

Given a function, you might be asked:

- is it 1-1 (how do you know)?
- is it onto (how do you know)?
- is it a homomorphism (how do you know)?

See 3.3 # 8, 11, 12, 18, 19 for examples of functions you might be asked about.