Math 345-60 Abstract Algebra I

Questions for Section 0: Sets and Relations

1. What is a set?
2. What is a subset of a set?
3. What is meant by the Cartesian product of two sets?
4. What is a relation between two sets?
5. What is a function? Give an example. How can it be expressed in terms of a relation?
6. What is the domain, codomain, and range of a function?
7. What is a one-to-one function? Give an example.
8. What is an onto function? Give an example.
9. What is a finite set? What is an infinite set?
10. What does it mean for two sets to have the same cardinality?
11. Give an example of two different sets having the same cardinality.
12. What is a partition of a set?
13. What are the residue classes modulo 5 of \( \mathbb{Z}^+ \)?
14. What is an equivalence relation on a set?
15. Given a partition of a set \( S \), how can you define an equivalence relation \( \sim \) on \( S \)?
16. Given an equivalence relation on a set \( S \), how can you define a partition of \( S \)?

Homework for Section 0, due ??? (only the starred problems will be graded):

   1, 9, 11, 12*, 13, 14*, 16, 17, 26, 28, 31, 35, 36*(a).