

Algebra Qualifying Exam January 2022 Guidelines

Exam Content Outline: The exam will be based on content equivalent to the following chapters from *Abstract Algebra*, 3rd Edition, by Dummit and Foote.

Group Theory Chapters 1, 2, 3, 4, Section 5.2

Ring Theory Chapters 7, 8, 9 (Section 9.6 excluded)

Module Theory Chapters 10, 12

Field and Galois Theory Chapter 13 (Section 13.3 excluded)

Chapter 14: Sections 14.1 through 14.6

The students can refer to Hungerford's *Algebra* and Lang's *Algebra* as additional resources for the content covered in the above list.

Exam Format: The exam will have 8 problems. The following instructions will be included with the exam.

1. Do seven problems out of eight. The exam is 70 points. Each problem is worth 10 points.
2. If you attempt solutions to all eight problems, then only the **first seven** submitted problems will be graded.
3. No calculators or other electronic devices are allowed.
4. Write in a legible fashion. Give proper mathematical justification of all your statements. Your solutions must be detailed enough to get full credit.
5. Start with a new sheet for each problem. Clearly write the problem number and your name before beginning your solution. For each sheet, write only on a single side. Arrange all papers by the order of the questions before submission.
6. All your submitted written responses will be graded. If you write any statements (correct or incorrect) which are not used in your solution, you will be penalized. Please make sure to erase clearly the responses you don't want to be graded.
7. If multiple version of solutions are provided, then all versions will be graded and then the average credits is taken as the final score.
8. No questions may be asked during the exam. If a problem appears ambiguous to you, interpret it in a way that makes sense to you but not in a way that makes it trivial.
9. Throughout the exam, if a question has multiple parts, you may assume any previous part as a true statement in order to answer the consecutive parts whenever needed.

Exam grade: In order to pass the algebra qualifying exam, you must satisfy the following two criteria:

- (a) Receive the full score from at least three questions.
- (b) Receive a passing score 70% or better; equivalently, 49 points or more out of the total 70 points.

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