

What kind of questions will appear on the final

Give an example of something, e.g.

- Give an example of a nonabelian group of order 16.
- Find an irreducible polynomial of degree 4 over \mathbb{Z}_7 .

Yes/no questions, give brief explanations or examples, e.g.

- Can an abelian group have a nonabelian subgroup?
- Can a nonabelian group have an abelian subgroup?
- Is a subring of a field necessarily a subfield?

Computational problems, e.g.

- How many positive divisors does $10!$ have?
- Solve the congruence $4x \equiv 2 \pmod{18}$
- Let $\sigma = (1253)$ and $\tau = (13)(24)$.
 1. Find $\sigma\tau$ and $\tau\sigma$.
 2. Find σ^{-1} and τ^{-1} .
 3. Find the orders of σ and τ .
 4. Are σ and τ cycles?

Conceptual problems, e.g.

- What is the order of the factor group $GL_2(\mathbb{R})/SL_2(\mathbb{R})$? Describe its elements. What familiar group is this group isomorphic to?
- Let F be a field. Prove that there exists infinitely many irreducible polynomials over F . Hint: recall the proof that there are infinitely many prime numbers.