What kind of questions will appear on the final

State and prove a theorem (any of the six theorems marked with a star), e.g.

- State and prove Euclid's theorem about prime numbers.

State a theorem (any theorem on the list), e.g.

- State the theorem that says when R/I is a field, and when it is a ring.

Give the definition of something, e.g.

- Give the definition of a maximal ideal.

Give an example of something, e.g.

- Give an example of a ring R and a prime ideal I.
- Give an example of a ring R and an ideal I that is not prime.
- 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?

Computational problems, e.g.

- 1. Write 10! as a product of primes.
  2. 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?