

Test 2 study guide:

Pay extra special attention to 13.1 and 13.2. Hint hint hint.

1. Look over the HW from 5402 and 4560. Look over the notes.
2. Take a look at the computations from HW (5402 and 4560) and from the class notes.

Possible topics include these:

- Determining if a polynomial is irreducible or not over a field (Eisenstein's test, other tests). We especially used this the constructions of $F[x] / (p(x))$ or $F(\theta)$.
- Constructing fields via the process $F[x] / (p(x))$
- Computing in $F[x] / (p(x))$
- Computing in $F(\theta)$
- Determining the minimal polynomial of an element (find it and show it's irreducible). (There are examples of this in the class notes. And also in the chapter 13 HW when we are working with field extensions and $F(\theta)$ and $[K:F]$.)
- Showing that $[K : F]$ equals some number (especially 13.2 handout problems and notes)
- Describing the elements of $K = F(\theta_1, \theta_2, \dots)$ by finding a basis for K over F and then expressing the elements in terms of this basis. In class this for things like $K = \mathbb{Q}(\text{sixth root of } 2)$ and $K = \mathbb{Q}(\text{square root of } 2, \text{ square root of } 3)$ and $\mathbb{Q}(\text{square root of } 2)$. In HW you compute some more.

3. Look at the proofs from the HW (5402 and 4560) for practice. Also look over the main proof statements from class from all the sections (Ch 8 – 13.2) so you can use those facts if needed in a proof. You don't have to memorize any class proofs, but take a look at them to know how the ideas work.

Possible proof topics include these:

- Principal ideals and Principal ideal domains
- Irreducible and prime elements
- Ideals in $F[x]$ and $F[x,y]$ where F is a field
- $F[x] / (p(x))$
- $F(\theta)$
- $[K : F]$