

**Suggested problems
(Not to be turned in)**

Chapter 1: 1, 4, 8

Chapter 2: a, d, 1, 3, 4, 8, 11, 12, 13

Chapter 3 a-f all, 2, 5, 9, 10, 12, 13

Assignments

Assignment 1 – Due Monday August 22

Chapter 2: 2.a

Assignment 2 – Due Friday August 26

On the proof of the existence and uniqueness of the division equation, in the case that $a > 0$ prove that $r < |a|$. See “notes 8-19” on Blackboard for the proof.

Assignment 3 – Due Friday September 1st

Chapter 2: #8 OR #12

Assignment 4 – Due Friday September 9th

Chapter 3: #10

Assignment 5 – Due Friday September 16th

Chapter 4: a-e all, 1, 2, 3, 4, 5, 6, 7, 10, 11, 12, 13

Choose one of problems 1-11 and orally explain how to do it. This must be completed in Dr. Beyerl’s office no later than Friday September 16th.

Assignment 6 – Due Friday September 23rd

Chapter 5: a-g all, 1, 2, 3, 4, 7, 8, 9, 10, 12, 14, 15, 17

Assignment 7 – Due Friday October 7th

Chapter 6: a-f all, 1, 3, 4, 5, 9, 10, 11, 12, 15, 16, 18, 22, 23

Assignment 7b – ~~Due Wednesday October 12th~~ Extra credit on October 10th if you have it.

Chapter 7: a-k all, 1, 3, 4, 9, 12, 17

Assignment 8 - Due Wednesday October 12th

Chapter 7: 2, 5, 16

Read the proof of theorem 8.1.

Assignment 9 - Due Monday October 17th

Chapter 8: c, 3, 5

Read the proofs of theorems 8.2 and 8.3.

Assignment 10 – Due Wednesday October 19th

Chapter 8: h, 7, 8

Read the proofs of theorems 8.5, 8.7, and 8.8.

Assignment 11 – Due Friday October 21st

Chapter 8: o, 9, 12, 13

Read chapter 9 up to example 9.5.

Assignment 12 – Due Monday October 24th

Chapter 9: a, 3

Read chapter in chapter 9 the proofs of theorems 9.1, 9.2, and 9.3.

Assignment 13 – Due Wednesday October 26th

Chapter 9: b, g, 14

Read corollary 9.4

Assignment 14 – Due Friday October 28th

Chapter 9: h, i, j, 17, simplify the ideal $\langle x^3 + 2, x^2 + 1 \rangle$ of $\mathbb{Q}[x]$.

Read section 10.1.

Assignment 15 – Due Monday October 31st

Chapter 10: a, c, 3, 11

Read the proof of theorem 10.3.

Assignment 16 – Due Wednesday November 2nd

Chapter 10: f, g, 22, 26

To begin reviewing for the test, review and compare the notions of rings, integral domains, fields, and principal ideal domains.

Assignment 17 – Due Friday, November 4th

Chapter 10: h, 28, 29

To continue reviewing for the test, review polynomial rings and ideals, try the problem (they need not be turned in):

1. A chain of ideals is a sequence $I_1 \subseteq I_2 \subseteq I_3 \subseteq \dots$ within a ring. It could be finite, or infinite. It could be ascending as illustrated in the previous sentence, or descending as in $I_1 \supseteq I_2 \supseteq I_3 \supseteq \dots$. Find a chain of 472 distinct ideals in \mathbb{Z} .
2. Find a chain of 472 distinct ideals in $\mathbb{Q}[x]$.
3. Find an ideal that is not principle in $\mathbb{Q}[x, y]$
4. In algebra, we define a monomial as the monomials you're familiar with, without the coefficient. In particular the expression " x^2y^3 " is a monomial, but " $5x^2y^3$ " is not a monomial. The latter is called a term. Find all monomials not in $\langle x^3y \rangle \subseteq \mathbb{Q}[x, y]$
5. Find an ideal of $\mathbb{Q}[x, y]$ whose complement contains only finitely many monomials.
6. Simplify the ideal $\langle x^2 + 3x, x^3 - x^2 + 3x - 3 \rangle$

Test 2 – Monday November 7th

Assignment 18 – For Friday November 11th (Nothing due, but there may be a reading quiz)

Read section 11.1 and pay particular attention to examples 11.3 and 11.6.

Assignment 19 – For November 14th

Chapter 11: b, c, d

Read theorem 11.1 and the proof of it.

Assignment 20 – For November 16th

Chapter 11: 1, 6, 13, 25

Read pages 135 and 136 (~~Up to example 12.1~~)

Read pages 143-145 and pay special attention to the proof of theorem 13.2.

Assignment 21 – For November 18th

Chapter 12: c, 2, 10

Chapter 13: c, d

Read: section 14.1 and 14.2 up through the fundamental isomorphism theorem. You don't need to read the proof, but you should try to work out an example of the fundamental isomorphism theorem to get a feel for what it's saying.

Test 3 (Take home) Due November 28th

Assignment 22 – For November 30th (Last one)

Chapter 16: d, 5, 6

Read 16.1 and 16.2