

Homework for MTH 411
Fall 2017

Textbook:

Abstract algebra, an introduction, by Thomas W. Hungerford, Third edition

Homework for week 08/30-09/01:

Due Wednesday 09/06

- 08/30: Chapter 2.2: ex 1, Chapter 2.3: ex 1, Chapter 7.1: ex 1 and 17
- 09/01: Chapter 7.1: ex 3acde, Chapter 7.2: ex 2,4,17

Homework for week 09/06-09/08:

Due Monday 09/11

- 09/06: Chapter 7.2: ex 6,7,9,10
- 09/08: Chapter 7.3: ex 14,15,21,33

Quiz on Friday 09/08

Covers Chap 7.1 and 7.2

Homework for week 09/11-09/15:

Due Monday 09/18

- 09/11: Chapter 7.3: ex 3, Chapter 7.4: ex 19,20
- 09/13: Chapter 7.3: ex 40, Chapter 7.4: ex 3,13,23
- 09/15: Chapter 7.5: ex 2,6,28

Homework for week 09/18-09/22:

Due Monday 09/25

- 09/18: Chapter 7.5: ex 8,22,26
- 09/20: Chapter 8.1: ex 10,11,18
- 09/22: Chapter 8.1: ex 4,5, Chap 8.2: ex 3

Quiz on Friday 09/22

Covers Chap 7.3, 7.4, 7.5

Homework for week 09/25-09/29:

Due Monday 10/02

- 09/25: Chapter 8.2: ex 11,12,18,31
- 09/27: Chapter 8.3: ex 8,13,30
- 09/29: Chapter 8.3: ex 14,28, Chap 8.4: ex 8

Homework for week 10/02-10/06:

Due Monday 10/09

- 10/02: Chapter 8.4: ex 10,14,18,22
- 10/04: Chapter 8.5: ex 2,4,11,12

Quiz on Friday 10/06

Covers Chap 8.1, 8.2, 8.3

Exam 1 on Wednesday 10/11

Covers Chap 7 and Chap 8.1 to 8.4 List of suggested review exercises for each chapter:

- Chapter 7.1: ex 10
- Chapter 7.2: ex 14,19
- Chapter 7.3: ex 10,24
- Chapter 7.4: ex 12,36
- Chapter 7.5: ex 21,37
- Chapter 8.1: ex 17,21
- Chapter 8.2: ex 5,26
- Chapter 8.3: ex 7,13
- Chapter 8.4: ex 27,31

Homework for week 10/13-10/20:

Due Monday 10/23

- 10/13: Chapter 9.1: ex 4,6
- 10/16: Chapter 9.2: ex 8,10
- 10/18: Chapter 9.2: ex 3,5,6,7
- 10/20: Chapter 9.3: ex 2,4,6,8

Homework for week 10/23-10/27:

Due Monday 10/30

- 10/23: Chapter 9.4: ex 2,8,12
- 10/25: Chapter 9.4: ex 10,14, Chapter 9.5: ex 2,17
- 10/27: Chapter 9.4: ex 9,12

Quiz on Friday 10/27

Covers Chapter 9.1 to 9.3

Homework for week 10/30-11/03:

Due Monday 11/06

- 10/30: Chapter 10.1: ex 1,2,3,4

- 11/01: Chapter 10.1: ex 8,11,14,26 + compute $\gcd(-1 + 3i, -3 + 5i)$.

Exam on Wednesday 11/08

Covers Chapter 9 and 10.1.

In Chapter 9.5, it covers only Thm 9.27, Cor 9.28, Cor 9.29, Thm 9.30, Thm 9.31

In Chapter 10.1, only the beginning up to Theorem 10.3 (proof excluded)

List of suggested review exercises:

Chapter 9.1: ex 1,13,17

Chapter 9.2: ex 3,5,11,19

Chapter 9.3: ex 5,7,9,11,23

Chapter 9.4: ex 1,3,21

Chapter 9.5: ex 1

Chapter 10.1: ex 5,7

+ compute the remainder in $\mathbb{Z}[i]$ of $1 + 7i$ divided by $3 + i$

+ compute $\gcd(-5 + 7i, -2 + 10i)$

Homework for week 11/10-11/17:

Due Monday 11/20

- 11/10: Chapter 10.1: ex 10,19,22,27
- 11/13: Chapter 10.2: ex 6,10,15
- 11/15: Chapter 10.2: ex 14,20
- 11/17: Chapter 10.2: ex 18,28,30

Homework for week 11/20-11/22:

Due Monday 11/27

- 11/20: Chapter 10.3: ex 2,4,6,9
- 11/22: Chapter 10.3: ex 10,12,14,18

Homework for week 11/27-12/01:

Due Monday 12/04

- 11/27: Chapter 11.1: ex 4,6,12,20
- 11/29: Chapter 11.1: ex 18,24,38,39
- 12/01: Chapter 11.2: ex 6,11,18

Quiz on Friday 12/01

Covers Chapters 10.2, 10.3 and 11.1

Exam on Friday 12/15

Covers Chapter 7,8 and 9, 10.1 to 10.3, 11.1 and 11.2.

Important notions in Chapter 7,8,9: the Sylow theorems, the classification of finite abelian groups, conjugacy classes, Lagrange's theorem, quotient groups and the 1st isomorphism

theorem, symmetric groups (cycle decomposition, even/odd permutations).

Important notions in Chapter 10: properties of integral domains, Euclidian domains, Principal ideal domains, Unique factorization domain. Examples and counterexamples of such domains (e.g. \mathbb{Z} , $F[X]$, $\mathbb{Z}[i]$, $\mathbb{Z}[\sqrt{-5}]$, $\mathbb{Q}_{\mathbb{Z}}[X]$). Quadratic integer rings; using the norm to detect units, irreducibles, associates and to compute divisors/factorizations.

Important notions in Chapter 11: linearly independent families, spanning sets, basis. Solving systems to prove a family is lin indep/spanning/a basis. Dimension of vector spaces and degree of extensions. Algebraic elements, minimal polynomials, computing the degree of a simple extension.

You can use the following list of exercises for review. Some are exercises we already did in class or as homework, others are new:

Chapter 7.5: ex 16,21

Chapter 8.1: ex 37

Chapter 9.2: ex 3,5,6,7

Chapter 9.3: ex 6,7,16

Chapter 9.4: ex 1,5,9

Chapter 10.1: ex 13,26,28

Chapter 10.2: ex 9,10,11,13,25

Chapter 10.3: ex 8,9,10,11,12,18

Chapter 11.1: ex 9,11,22,25

Chapter 11.2: ex 6,9,14,17,18,19