

REVIEW FOR FINAL, MATH 311W, Sect. 4 & 5.

CHAPTER 1.

Theorems (and Corollaries) you should know how to prove

Theorems 1.1.1, 1.1.5, 1.6.5

Corollary 1.3.4 and 1.4.4

Theorems (and Corollaries) you should be able to apply to solve problems and prove other theorems.

Theorems 1.1.2, 1.1.6, 1.3.1, 1.3.3, 1.3.5, 1.4.3
1.5.1, 1.5.2, 1.6.3, 1.6.6

Corollary 1.6.8

Definitions. primes, composite numbers,

\mathbb{Z} , \mathbb{Z}_n , \mathbb{P} , \mathbb{Q} , \mathbb{R} , \mathbb{C} , G_n , g.c.d., h.c.f.,
congruence classes mod n , zero divisors in \mathbb{Z}_n
finite multiplicative order modulo n .

Additional. Know and be able to use the Principle of Mathematical Induction.

Know and be able to use the Least Integer Principle.

Be able to decode messages using the Public Key Code.

Be able to do the problems that were assigned in homework.

CHAPTER 2

Theorems you should know how to prove

Theorem 2.1.1. Note: Each proof should follow the pattern on page 81 where it is proved that $(X \cup Y)^c = X^c \cap Y^c$. Venn Diagram proofs are not acceptable

Theorem 2.3.1

Theorems (and Corollaries) you should be able to apply to solve problems and prove other theorems.

Theorems 2.2.3

Corollary 2.2.4

Definitions. Union $X \cup Y$, Intersection $X \cap Y$
Relative complement $X \setminus Y$, complement X^c
disjoint, Cartesian product, function,
image, domain, co-domain, surjection,
injection, bijection, composition of functions,
relation, reflexive, symmetric, anti-symmetric,
weakly anti-symmetric, transitive, inverse,
partition of a set, equivalence classes

AND Be able to do the problems that were assigned in homework.

CHAPTER 4

Theorems you should know how to prove.

Theorem 4.1.1, 4.2.2, 4.3.1

Theorems you should be able to apply to solve problems and prove other theorems.

^{4.1.3,}
Theorem 4.2.1, 4.2.3, 4.2.4, 4.2.6

Lemma 4.2.5

Definitions. permutation, $S(n)$ the symmetric group, cycle, disjoint cycles, cycle decomposition, powers π^n , order of a permutation, $\begin{pmatrix} 1 & 2 & 3 & \dots & n \\ \pi(1) & \pi(2) & \pi(3) & \dots & \pi(n) \end{pmatrix}$, group, dihedral group $D(n)$.

Additional. Be able to decompose a product of cycles into disjoint cycles. Be able to write a permutation as a product of disjoint cycles.

Be able to do the problems that were assigned in homework. Be able to identify rings, fields ~~and vector spaces~~ when you are given the axioms

CHAPTER 5

Theorems (and Corollaries) you should be able to apply to solve problems and prove other theorems.

Corollary 5.1.2

Theorems 5.1.1, 5.1.3, 5.1.4, 5.1.5, 5.1.6,
5.2.2, 5.2.3

Definitions. order of an element,
infinite order of an element, subgroup,
cyclic group, left coset, right
coset, order of a group

Additional. Be able to do the
problems that were assigned
in homework.