

Schedule

A week-by-week breakdown of the material.

Week 1

Monday

- Introduction
- Writing Mathematics¹
- Sets, set notation²
- Subsets³
- Set Operations⁴
- Quiz 0⁵ (Due Monday night together with Quiz 1)
- Homework 1 due Tuesday⁶
- Prepare for class presentation:
 - Exercises 1.9, 1.19, 1.34

Tuesday

- Indexed Collections of sets⁷
- Set Partitions⁸
- Cartesian Products⁹
- Quiz 1¹⁰ (Due Monday night together with Quiz 2)
- Homework 2 due Wednesday¹¹
- Prepare for class presentation:
 - Exercises 1.41, 1.54

Wednesday

- Statements¹²
- Negations¹³

¹[notes/writing.html](#)

²[notes/sets_notation.html](#)

³[notes/subsets.html](#)

⁴[notes/set_operations.html](#)

⁵<https://moodle.hanover.edu/mod/quiz/view.php?id=19351>

⁶[assignments/hw1.html](#)

⁷[notes/indexed_collections.html](#)

⁸[notes/sets_partitions.html](#)

⁹[notes/cartesian_products.html](#)

¹⁰<https://moodle.hanover.edu/mod/quiz/view.php?id=19389>

¹¹[assignments/hw2.html](#)

¹²[notes/statements.html](#)

¹³[notes/negation.html](#)

- Disjunction and Conjunction¹⁴
- Implications¹⁵
- Quiz 2¹⁶ (Due Tuesday night)
- Homework 3 due Thursday¹⁷
- Prepare for class presentation:
 - Exercises 2.18, 2.29, 2.32

Thursday

- Biconditional¹⁸
- Tautologies, Contradictions¹⁹
- Logical Equivalence²⁰
- Fundamental properties of logical equivalence²¹
- Quiz 3²² (Due Wednesday night)
- Homework 4 due Friday²³
- Prepare for class presentation:
 - Exercises 2.39, 2.50, 2.53

Friday

- Exam 1

Week 2

Monday

- Quantified Statements²⁴
- Characterization²⁵
- Quiz 4²⁶ (Due Sunday night)
- Homework 5 due Tuesday²⁷

¹⁴[notes/disjunction_conjunction.html](#)

¹⁵[notes/implications.html](#)

¹⁶<https://moodle.hanover.edu/mod/quiz/view.php?id=19403>

¹⁷[assignments/hw3.html](#)

¹⁸[notes/biconditional.html](#)

¹⁹[notes/tautologies_contradictions.html](#)

²⁰[notes/logical_equivalence.html](#)

²¹[notes/logical_equiv_properties.html](#)

²²<https://moodle.hanover.edu/mod/quiz/view.php?id=19429>

²³[assignments/hw4.html](#)

²⁴[notes/quantified_statements.html](#)

²⁵[notes/characterization.html](#)

²⁶<https://moodle.hanover.edu/mod/quiz/view.php?id=19644>

²⁷[assignments/hw5.html](#)

Tuesday

- Trivial and Vacuous Proofs²⁸
- Direct Proofs²⁹
- Proof by Contrapositive³⁰
- Prepare for class presentation:
 - Exercises 3.10, 3.18
- Quiz 5³¹ (Due Monday night)
- Homework 6 due Wednesday³²

Wednesday

- Proof by cases³³
- Direct and Contrapositive proofs for divisibility³⁴
- Direct and Contrapositive proofs for congruence³⁵
- Prepare for class presentation:
 - Exercises 3.28, 4.16
- Quiz 6³⁶ (Due Tuesday night)
- Homework 7 due Thursday³⁷

Thursday

- Direct and Contrapositive proofs for real numbers³⁸
- Proofs involving sets³⁹
- Properties of set operations, cartesian products⁴⁰
- Prepare for class presentation:
 - Exercises 4.34, 4.38, 4.44, 4.58, 4.62, 4.64
- Quiz 7⁴¹ (Due Wednesday night)
- Homework 8 due Friday⁴²

²⁸[notes/trivial_vacuous_proofs.html](#)

²⁹[notes/direct_proofs.html](#)

³⁰[notes/contrapositive.html](#)

³¹<https://moodle.hanover.edu/mod/quiz/view.php?id=19782>

³²[assignments/hw6.html](#)

³³[notes/proofs_cases.html](#)

³⁴[notes/proofs_divisibility.html](#)

³⁵[notes/proofs_congruence.html](#)

³⁶<https://moodle.hanover.edu/mod/quiz/view.php?id=19786>

³⁷[assignments/hw7.html](#)

³⁸[notes/proofs_reals.html](#)

³⁹[notes/proofs_sets.html](#)

⁴⁰[notes/set_properties.html](#)

⁴¹<https://moodle.hanover.edu/mod/quiz/view.php?id=19787>

⁴²[assignments/hw8.html](#)

Friday

- Catching up
- Exam 2

Week 3

Monday

- Proofs by counterexample⁴³
- Proofs by contradiction⁴⁴
- Existence proofs⁴⁵
- Prepare for class presentation:
 - Exercises 5.6, 5.18
- Quiz 8⁴⁶ (Due Sunday night)
- Homework 9 due Tuesday⁴⁷

Tuesday

- Principle of Mathematical Induction⁴⁸
- General Principle of Mathematical Induction⁴⁹
- Proofs by Minimum Counterexample⁵⁰
- Prepare for class presentation:
 - Exercises 6.8, 6.18
- Quiz 9⁵¹ (Due Monday night)
- Homework 10 due Wednesday⁵²

Wednesday

- Strong Principle of Mathematical Induction⁵³
- Testing Statements⁵⁴

⁴³[notes/proofs_counterexample.html](#)

⁴⁴[notes/proofs_contradiction.html](#)

⁴⁵[notes/proofs_existence.html](#)

⁴⁶<https://moodle.hanover.edu/mod/quiz/view.php?id=19997>

⁴⁷[assignments/hw9.html](#)

⁴⁸[notes/mathematical_induction.html](#)

⁴⁹[notes/general_induction.html](#)

⁵⁰[notes/proofs_minimum_counterexample.html](#)

⁵¹<https://moodle.hanover.edu/mod/quiz/view.php?id=20014>

⁵²[assignments/hw10.html](#)

⁵³[notes/strong_induction.html](#)

⁵⁴[notes/testing_statements.html](#)

- Introduction to Relations⁵⁵
- Prepare for class presentation:
 - Exercises 6.44, 7.33, 7.50, 7.68, 8.4
- Quiz 10⁵⁶ (Due Tuesday night)
- Homework 11 due Thursday⁵⁷

Thursday

- Properties of Relations⁵⁸
- Equivalence Relations⁵⁹
- Prepare for class presentation:
 - Exercises 8.14, 8.18, 8.28, 8.29
- Quiz 11⁶⁰ (Due Wednesday night)
- Homework 12 due Friday⁶¹

Friday

- Catchup
- Exam 3

Week 4

Monday

- Equivalence Classes
- Congruences as an equivalence
- Quiz 12 (Due Sunday night)

Tuesday

- Arithmetic on Integers modulo n
- Definition of functions
- Quiz 13 (Due Monday night)

⁵⁵[notes/relations_intro.html](#)

⁵⁶<https://moodle.hanover.edu/mod/quiz/view.php?id=20039>

⁵⁷[assignments/hw11.html](#)

⁵⁸[notes/relations_properties.html](#)

⁵⁹[notes/relations_equivalence.html](#)

⁶⁰<https://moodle.hanover.edu/mod/quiz/view.php?id=20078>

⁶¹[assignments/hw12.html](#)

Wednesday

- One-to-one and onto functions
- Bijective functions, Inverse function
- Image and inverse image of sets under functions/relations. Properties
- Quiz 14 (Due Tuesday night)

Thursday

- Numerically Equivalent sets
- Denumerable sets
- Quiz 15 (Due Wednesday night)

Friday

- Uncountable sets
- Comparing cardinalities
- Schroder-Bernstein theorem
- Wrap-up
- Exam 4