Math 30710 Assignments, Spring 2023

Reading should be completed **before** class on the given date.

Be careful to justify your solution when a homework problem calls for it. Assignments are due on FRIDAYS unless otherwise specified. As long as we are holding class in the classroom, physical assignments will be collected in class. If we have to go online, instructions will be given at that time for turning in your work. The future, as-yet unassigned assignments below are subject to revision.

Date	Section/Topic	Reading (page numbers)	Problems	Due
1/18/23	0. Sets and relations	1–8	§0: #3, 5, 7, 11, 12, 13, 15, 16, 17, 25, 28, 31, 32	1/27/23
1/20/23, 1/23/23	1. Introduction	11–18	§1: #3, 7, 11, 13, 19, 23, 29, 33, 35, 37, 39, 40	1/27/23
1/25/23	2. Binary operations	20–25	§2: #2–8, 12, 14–18, 23, 24	2/3/23
1/27/23	3. Isomorphisms	28–34	§3: #1, 2–4, 6–7, 17, 20–23, 26–29	2/3/23
1/30/23	4. Groups	36–43	§4: #1–3, 7, 10, 11–13, 19, 22, 23, 25	2/10/23
2/1/23	4/5. Groups/subgroups	43–45, 49–52	§4: #26–28, 31–33; §5: 1, 2, 5, 11–12, 14	2/10/23
2/3/23	5. Subgroups	53–55	§5: #20, 22, 23, 26, 36, 39, 42, 44, 53, 54	2/10/23
2/6/23	6. Cyclic groups	59–65	§6: #1, 5, 11, 14, 15, 17, 20, 21, 22, 25, 30, 31, 32	2/17/23
2/8/23, 2/10/23	6. Cyclic Groups		§6: #36, 37, 38, 42, 44, 49;	2/17/23
2/13/23, 2/15/23	7. Generators and Cayley digraphs	68–72	§7: #1, 6, 7, 9, 10, 16, 17, 18, 19 (Hint: see #9)	2/24/23
2/15/23	8. Permutation groups	75–81	§8: #1, 5, 6, 8, 10, 11, 17, 18, 23, 24	2/24/23
2/17/23	8. Permutation groups, Cayley's theorem	81–83	§8: #30, 31, 35, 39, 41, 43, 47	2/24/23
2/20/23	Proof of Cayley's theorem		–	–
2/22/23	9. Orbits, cycles, even and odd permutations, alternating groups	87–93	–	–
2/24/23	9. Orbits, cycles, even and odd permutations, alternating groups		§9: #1, 6, 7, 10, 13, 14, 15, 19–23, 29, 34	3/10/23
2/27/23	Review	–	–	–
3/1/23	Exam 1	Includes all material in sections 1–8 and 1st part of §9.	–	–
3/3/23	9. Orbits, cycles, even and odd permutations, alternating groups	–	–	–
3/6/23	10. Cosets	96–100	§10: #1–4, 6–7, 12, 13, 15, 19, 20–24	3/24/23
3/8/23	10 Lagrange's Theorem	100–101	§10: #27, 30–34, 37, 41, 43	3/24/23
3/10/23	11. Products	104–110	Get started on §11 HW	–
3/20/23	11. Finite abelian groups	104–110	§11: #1, 2, 7, 8, 9, 13, 14, 18, 20, 24, 32, 36, 46, 47	3/31/23
3/22/23	13. Homomorphisms	125–129	§13: #1–5, 9, 10, 16, 17, 22, 24, 25, 28, 29	3/31/23

3/24/23	13. Homomorphisms	129–133	§13: #32, 33, 34, 39, 42, 47, 48, 49, 52	3/31/23
3/27/23	14. Factor groups	135–139	§14: #1, 2, 7, 9, 10	4/14/23
3/29/23	14. Factor groups	139–141	§14: #17, 18, 20, 23a-d, 24, 30	4/14/23
3/31/23	14. Factor groups - summary	135–141	–	–
4/3/23	15. Factor groups/Simple groups	144–148	§15: #1–5, 19, 28	4/14/23
4/5/23, 4/12/23	15. Factor groups/Simple groups	149–151	§15: #30, 31, 34	4/14/23
4/14/23	18. Rings and Fields	167–170	§18: #3, 5, 7, 9, 11, 14, 15, 16, 17, 19	4/28/23
4/17/23	Review			
4/19/23	Exam 2	Covers §§9, 10, 11, 13, 14, 15		
4/21/23	18. Rings and Fields	171–174	§18: #20, 22, 23, 24, 25, 27, 28, 33, 37, 38	4/28/23
4/24/23	24/19 Quaternions/Domains	177–179, 224–226	§19: #1–4, §24: 4–7	4/28/23
4/26/23, 4/28/23	19. Domains	177–182	§19: #5, 7, 9, 11, 12, 14, 15–18, 23, 29	not collected, but do them!
4/28/23	20. Fermat's and Euler's theorems	184–189	§20: #1–10	not collected, but do them!
	20. Fermat's and Euler's theorems (cont.)			
	21. Field of Quotients	190–196	§21: #1, 2, 4, 5, 6–11	
	22. Polynomials	198–207	§22: #1, 2, 6, 7, 9, 13, 17, 22, 23, 25	
	23. Factorization	209–214	§23: #2, 4, 6, 8, 9, 11, 13	
	23. Factorization (cont.); 26. Ideals	209–218	§23: #14, 16, 18, 20, 21, 25, 26, 27, 28	
5/1/23	26. Ideals, Factor rings	237–243	§26: #3, 4, 17	not collected, but do them!
	Factor rings, finite fields			
	Applications to geometry			
	29. Field extensions, 31. Algebraic extensions	265–272, 283–286	§29: #1, 3, 9, 10, 11, 13 §31: 1–6	
	32. Geometric constructions	293–299		