

Math 2001 — Spring 2014

Assignments

Last revised: December 10, 2014 at 3:20pm

Warning: This table will change as the semester progresses! Consult the course website for an up-to-date version of this file. If you are viewing this file in a web browser, press reload to make sure you are viewing the most updated version.

All answers must be fully justified *in complete sentences*, except on problems marked with a dagger (\dagger). An expression of the form $3-6^\dagger$ means that the dagger applies to all of problems 3 through 6; something like $7ab^\dagger$ means that the dagger applies to parts a and b of problem 7. Solutions to dagger problems should still be justified, but complete sentences are not required and it should be possible to fit the justification in a single line.

Some problems have a footnote with further explanation.

Week 1	Lecture	Assignment
0		HW: Bring clickers to the first class Read: Syllabus
1	August 25	Syllabus What is mathematics? How to read a math text
2	August 27	Mathematical definition HW: §3 (p. 6), #1–3, 4 ¹ , 6, 12, 13a Read: Scheinerman, §4 (pp. 8–13)
3	August 29	Mathematical statements Propositions, theorems, and conjectures HW: §4 (p. 13), 2adegijk ² , 3, 4, 10, 12 ³ Read: Scheinerman, §7 (pp. 25–28)
Week 2		
4	September 3	Propositional calculus Boolean algebra HW: §4 (p. 13), #1abcg, 7 ⁴ , supplement 4, #1–2, §7 (p. 28), #1, 4, 7, 10a Read: Scheinerman, §§8 (pp. 33–38)
5	September 5	Lists HW: §8 (p. 38), #2, 5, supplement 5, ⁵ #1–2, Read: Scheinerman, §9 (pp. 40–42)

¹You should write your answer as a mathematical definition. Make sure to emphasize the term being defined with italics or an underline. Your definition may rely on the following concepts, which you do not have to define: natural number, integer, addition, subtraction, multiplication, division, zero, one.

²Be *very* careful with part (d)!

³Exercise 12b asks you to analyze the sums of consecutive cubes but shows examples of sums of consecutive *odd* cubes. You should be looking at the numbers 1^3 , $1^3 + 2^3$, $1^3 + 2^3 + 3^3$, $1^3 + 2^3 + 3^3 + 4^3$, etc.

⁴Also write a precise statement of the Pythagorean theorem.

⁵The supplement is hyperlinked. If you cannot access it, download it from the course webpage at <http://math.colorado.edu/~jonathan.wise/>

Week 3

6	September 8	Lists	HW: §8 (p. 38), #9, 16 supplement 6, #1 §9 (p. 42), #1 [†] , 5 [†] , 6, 13 Read: Scheinerman, §10 (pp. 43–50)
7	September 10	Factorials Sum and product notation	HW: §9 (p. 42), #8 ^{†6} , 10, 15abc supplement 7, #1–2
8	September 12	Sets and subsets	HW: §10 (p. 50), #1abcd,2,3abcdh, 6bd,7d ^{†7} Read: Scheinerman, §11 (pp. 51–54)

Week 4

9	September 15	Sets and subsets	HW: §10 (p. 50), #1efg,3efg,4,5,6ac, 7abc,14 [†] §11 (p. 54), #1ab [†] ,2ab,6 Read: Scheinerman, §12 (pp. 56–64)
10	September 17	Quantifiers Operations on sets	HW: §11 (p. 54), #1ghij [†] , 2ghij [†] , 4, 5aeg, 7, 8 supplement 10, #1 Read: §12 (pp. 56–64)
11	September 19	Operations on sets	HW: §12 (p. 64), #1 [†] , 2, 3, 9, 21 [†] , 25 ⁸

Week 5

12	September 22	Review	
Exam 1	September 23	Midterm exam 1	6–7:15pm (tentative)

All assignments must be typed from now on!

13	September 24	Exam discussion	HW due Weds., Oct. 1: Write an explanation of why you lost credit for each exam problem on which you did not receive full credit.
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⁶In each part, you should find a simple formula for the answer that does not use the \prod symbol. A formula that is more complicated than necessary will not receive full credit.

⁷On problem 7, just mark the statements true or false. You do not need to write a proof.

⁸Hint: It may help to look at Exercise 7.16.

14	September 26	L ^A T _E X Meet in DUANG116	HW	due Mon. Sept. 29: Assignment 14
			Read	for Mon. Sept. 29: §5 (pp. 15–22)

Week 6

15	September 29	Proofs	HW	due Weds. Oct. 1: Assignment 15
			Read	for Weds. Sept. 29: §5–§6 (pp. 15–25)
16	October 1	Proofs	HW	due Fri. Oct. 3: Assignment 16 [tex] [writeLaTeX]
			Read	for Fri. Oct. 3: §20 (pp. 119–124)
17	October 3	Proof by contradiction	HW	due Mon. Oct. 6: Assignment 17 [tex] [writeLaTeX]
			Read	for Mon. Oct. 6: §22 (pp. 135–145)

Week 7

18	October 6	Induction	HW	due Weds. Oct. 8: Assignment 18 [tex] [writeLaTeX]
			Read	for Weds. Oct. 8: §22 (pp. 135–145) (again!)

All assignments must submitted via D2L from now on!
<http://learn.colorado.edu>

19	October 8	Induction	HW	due Fri. Oct. 10: Assignment 19 [tex] [writeLaTeX]
			Read	for Fri. Oct. 10: §20 (pp. 119–124), §22 (pp. 135–145) (again!)
20	October 10	Induction	HW	due Mon. Oct. 13: Assignment 20 [tex] [writeLaTeX]
			Read	for Mon. Oct. 13: §8 (pp. 33–38), §9 (pp. 40–42) (again!)

Week 8

21	October 13	Lists and factorial (again)	HW	due Weds. Oct. 15: Assignment 21 [tex] [writeLaTeX]
22	October 15	Induction	HW	due Fri. Oct. 17: Assignment 22 [tex] [writeLaTeX]
			Read	for Fri. Oct. 17: §10 (pp. 43–51), §12 (pp. 56–64) (again!)

23	October 17	Sets	HW due Mon. Oct. 20: Assignment 23 [tex] [writeLaTeX] Read for Mon. Oct. 20: §14 (pp. 73–76)
Week 9		Counting and relations	Reading: §§14–15 Suggested problems: §14, #1, 4, 6, 12–16, 17 §15, #1, 3, 4, 6–8, 16, 17
24	October 20	HW due Weds. Oct. 22: Assignment 24 [tex] [writeLaTeX] Read for Weds. Oct. 22: §14 (pp. 73–76) (again!)	
25	October 22	HW due Fri. Oct. 24: Assignment 25 [tex] [writeLaTeX]	
26	October 24	HW due Mon. Oct. 27: Assignment 26 [tex] [writeLaTeX] Read for Mon. Oct. 27: §15 (pp. 78–83)	
Week 10		Equivalence relations and functions	Reading: §§15, 24, 26 Suggested problems: §15, #1, 3, 4, 6–8, 16, 17 §24, #1–4, 8–9, 12, 14–17, 19–24 §26, #1, 6, 8, 11–13
27	October 27	HW due Weds. Oct. 29: Assignment 27 [tex] [writeLaTeX] Read for Weds. Oct. 29: §16, up to “Counting Classes/Parts” (pp. 85–86)	
28	October 29	HW due Fri. Oct. 31: Assignment 28 [tex] [writeLaTeX] Read due Fri. Oct. 31 §15 (pp. 78–83), §16 (pp. 85–88)	
29	October 31	HW due Mon. Nov. 3: Assignment 29 [tex] [writeLaTeX] Read due Mon. Nov. 3 §20 (pp. 119–124), §22 (pp. 135–145)	
Week 11			
30	November 3	Review	
31	November 5		
Exam 2			
32	November 7	Bijections	Assignment 32 [tex] [writeLaTeX]
Week 12			
33	November 10	Functions	Assignment 33 [tex] [writeLaTeX]
34	November 12	Injections, surjections, bijections	Assignment 34 [tex] [writeLaTeX]
35	November 14	Injections, surjections, bijections	Assignment 35 [tex] [writeLaTeX]
Week 13			
36	November 17	Infinite sets	Assignment 36 [tex] [writeLaTeX]
37	November 19	Composition and equality of functions	Assignment 37 [tex] [writeLaTeX]

38	November 21	Cardinality	Assignment 38 [tex] [writeLaTeX]
Fall break!			
Week 14			
39	December 1	Counting	Assignment 39 [tex] [writeLaTeX]
40	December 3	Counting	Assignment 40 [tex] [writeLaTeX]
41	December 5	Counting	Assignment 41 [tex] [writeLaTeX]
Week 15			
42	December 8	Binomial coefficients	Assignment 42 [tex] [writeLaTeX]
43	December 10	Binomial coefficients	Assignment 43 [tex] [writeLaTeX]
44	December 12		
Exam 3	TBA	Final exam	