

Instruction Booklet

MIT Sudoku Competition

Saturday, March 18, 2023

Rounds:

Classic

Variants I

Variants II

Team

Divisions:

Beginner

Experienced

General notes:

- Only the puzzles you solve that are marked for the division you're signed up for will be graded
 - Within each cell, we will consider the biggest number written within them
 - Please let us know if you find anything wrong in the IB or want clarifications with anything
 - You are allowed to print the IB out and bring it with you, but the rules will be on the tests as well (just without the examples). For the sake of trees and sanity we will not be printing this out for everyone.
 - No calculators, online tools, etc., are allowed. Please bring writing utensils – we have limited pencils.
 - We will try to give back test booklets after grading, so you'll have access to all the puzzles.
 - We are not being strict on formally declaring teams before the test, so during the team round please write all of your names on the booklet.
 - Prizes will be given to top individuals and top team in each division.
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- Most importantly, have fun :)

Classic Round

Beginner Points:

Puzzle 1	3
Puzzle 2	2
Puzzle 3	2
Puzzle 4	3
Puzzle 5	8
Puzzle 6	8
Puzzle 7	10
Puzzle 8	8
Puzzle 9	8
Puzzle 10	5
Puzzle 11	5
Puzzle 12	6
Puzzle 13	6
Puzzle 14	10
Puzzle 15	8
Puzzle 16	8
Total	100

Experienced Points:

Puzzle 1	5
Puzzle 2	10
Puzzle 3	6
Puzzle 4	5
Puzzle 5	8
Puzzle 6	13
Puzzle 7	6
Puzzle 8	20
Puzzle 9	10
Puzzle 10	8
Puzzle 11	9
Total	100

Classic Round Rules

Rules: Place the digits 1-9 in the empty squares in the grid, such that every row, column, and marked 3x3 square contains each of the digits exactly once.

Example:

1	2	3				6		9
	4					5	2	3
5	6	7				8		4
			3	7	1			
				5				
7	3	1		9		4	5	6
8			1		3		7	
3	1	5			2	9	8	
4					1			

1	2	3	4	8	5	6	7	9
9	4	8	1	6	7	5	2	3
5	6	7	9	2	3	8	1	4
6	5	4	3	7	1	9	8	2
2	8	9	6	5	4	7	3	1
7	3	1	2	9	8	4	5	6
8	9	6	5	1	2	3	4	7
3	1	5	7	4	6	2	9	8
4	7	2	8	3	9	1	6	5

Variants Round I

Beginner Points:

Antiknight, 6x6	4
Extra Regions, 6x6	3
Little Killer, 6x6	4
Palindrome, 6x6	3
Prime Sums, 6x6	5
Ratio, 6x6	4
Sandwich Sums, 6x6	5
Difference or Greater, 6x6	13
Quadruples, 6x6	20
No 3 in a Row, 6x6	14
Arrow, 6x6	11
Thermo, 6x6	14
Total	100

Experienced Points:

Difference or Greater, 6x6	14
Quadruples, 6x6	11
No 3 in a Row, 6x6	6
Arrow, 6x6	8
Thermo, 6x6	7
Killer, 6x6	18
Thermo	13
Either/Or	10
X-Sums	13
Total	100

Variant Round I Rules

6x6 Rules: Place the digits 1-6 in the empty squares in the grid, such that every row, column, and marked 2x3 square contains each of the digits exactly once.

[Beginner] Antiknight 6x6:

Normal 6x6 sudoku rules apply. The same digit may not appear a chess knight's move away from itself.
(Example is 9x9, but contest puzzle will be 6x6)

		4				7		
		1		2				
	5		3		6			
					8			
	8				9			
	6							
	3		8		2			
		9		7				
	1				8			

1	3	4	6	5	8	7	9	2
7	8	6	1	9	2	4	3	5
2	9	5	7	3	4	6	1	8
4	2	9	3	7	6	5	8	1
3	1	8	4	2	5	9	7	6
5	6	7	8	1	9	3	2	4
6	7	3	5	8	1	2	4	9
8	4	2	9	6	7	1	5	3
9	5	1	2	4	3	8	6	7

[Beginner] Extra Regions 6x6:

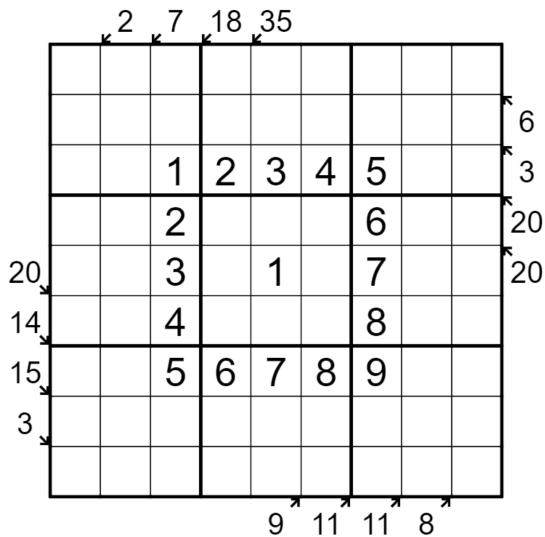
Normal 6x6 sudoku rules apply. The digits 1-6 must appear exactly once in each shaded region.
(Example is 9x9, but contest puzzle will be 6x6)

7	8							
1		6	5		7	8		
						9		
5		4						
	4	8	9		3			
			2			4		
1								
2	3		8	7			9	
					2	4		

7	8	6	2	9	4	1	5	3
1	9	4	6	5	3	7	8	2
5	3	2	1	7	8	4	9	6
9	5	7	3	4	1	2	6	8
2	4	1	8	6	9	5	3	7
3	6	8	7	2	5	9	4	1
6	1	9	4	3	2	8	7	5
4	2	3	5	8	7	6	1	9
8	7	5	9	1	6	3	2	4

[Beginner] Little Killer 6x6:

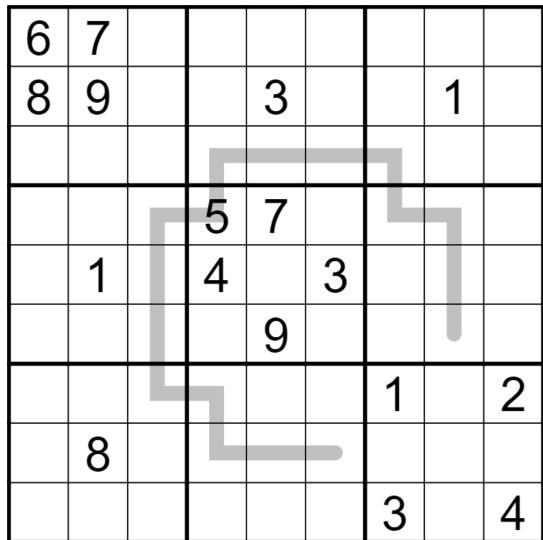
Normal 6x6 sudoku rules apply. Numbers with arrows indicate the sum of the numbers in that direction.
(Example is 9x9, but contest puzzle will be 6x6)



2	3	7	9	8	5	4	1	6
4	5	8	7	6	1	3	9	2
6	9	1	2	3	4	5	8	7
9	1	2	8	5	7	6	3	4
5	8	3	4	1	6	7	2	9
7	6	4	3	2	9	8	5	1
1	2	5	6	7	8	9	4	3
8	4	6	1	9	3	2	7	5
3	7	9	5	4	2	1	6	8

[Beginner] Palindrome 6x6:

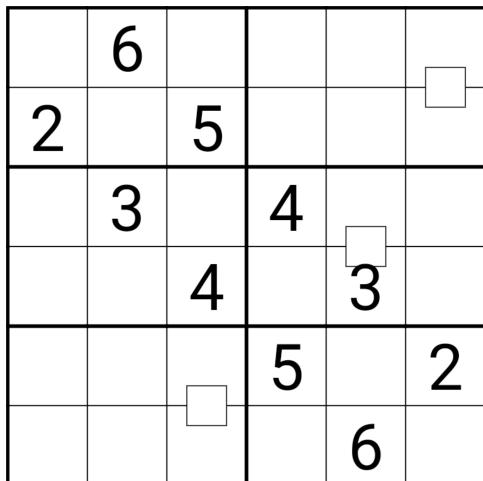
Normal 6x6 sudoku rules apply. Numbers along shaded lines must be the same forwards and backwards.
(Example is 9x9, but contest puzzle will be 6x6)



6	7	3	1	4	5	2	9	8
8	9	5	6	3	2	4	1	7
1	2	4	9	8	7	6	5	3
2	4	9	5	7	1	8	3	6
5	1	8	4	6	3	7	2	9
3	6	7	2	9	8	5	4	1
4	3	6	8	5	9	1	7	2
7	8	1	3	2	4	9	6	5
9	5	2	7	1	6	3	8	4

[Beginner] Prime Sums 6x6:

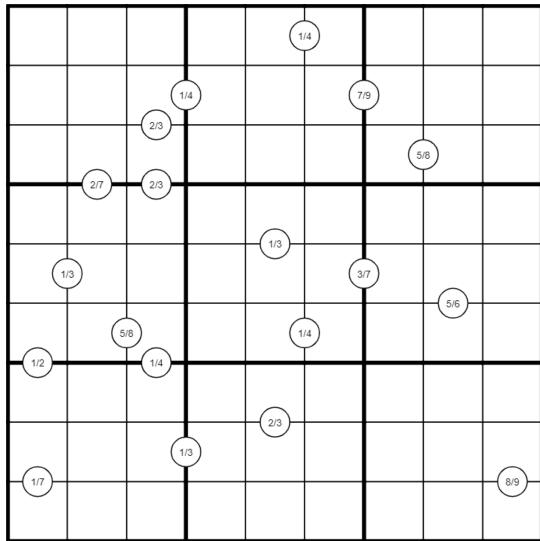
Normal 6x6 sudoku rules apply. Adjacent pairs of numbers marked with boxes must add to a prime number. Not all boxes are marked.



3	6	1	2	5	4	
2	4	5	6	1	3	
1	3	6	4	2	5	
5	2	4	1	3	6	
6	1	3	5	4	2	
4	5	2	3	6	1	

[Beginner] Ratio 6x6:

Normal 6x6 sudoku rules apply. Ratios between pairs of numbers (the smaller number over the greater number) are marked. (*Example is 9x9, but contest puzzle will be 6x6*)



5	1	7	6	8	2	4	9	3
8	3	4	1	5	9	7	2	6
9	2	6	4	7	3	5	8	1
4	7	9	5	3	6	8	1	2
2	6	1	8	9	7	3	5	4
3	5	8	2	1	4	9	6	7
6	9	2	7	4	8	1	3	5
1	4	3	9	6	5	2	7	8
7	8	5	3	2	1	6	4	9

[Beginner] Sandwich Sums 6x6:

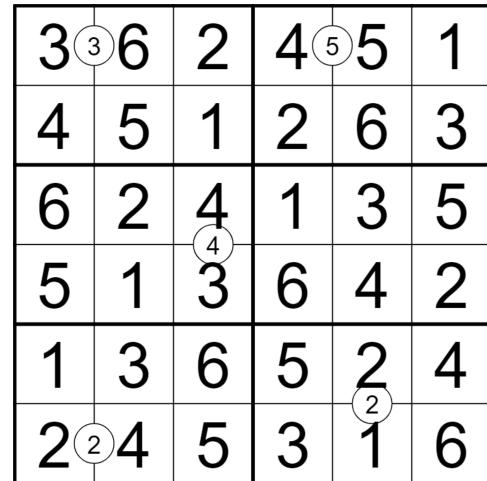
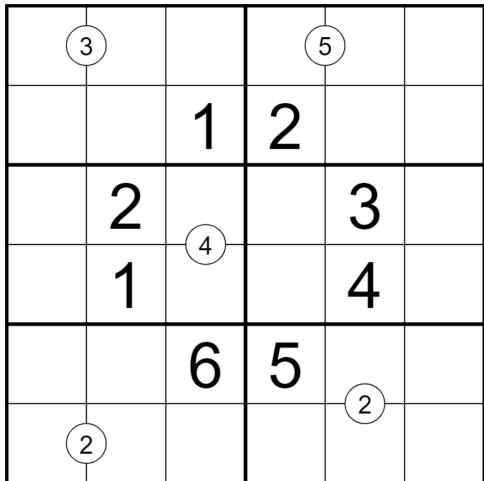
Normal 6x6 sudoku rules apply. Numbers at ends of rows and columns represent the sum of digits in between 1 and 6 (non-inclusive) in that row or column. (*Example is 9x9, but contest puzzle will be 6x6*)

20	20	0	22	14	22	20	30	2
8								
29	1					9		
35								
7								
28								
7								
5								
21	9					1		
2								

20	20	0	22	14	22	20	30	2
8	3	7	4	1	8	9	5	2
29	2	1	8	3	6	5	7	9
35	9	5	6	2	7	4	3	8
7	8	6	3	4	9	7	1	5
28	5	2	1	8	3	6	4	7
7	7	4	9	5	2	1	8	6
5	1	3	2	9	5	8	6	4
21	6	9	5	7	4	3	2	1
2	4	8	7	6	1	2	9	3

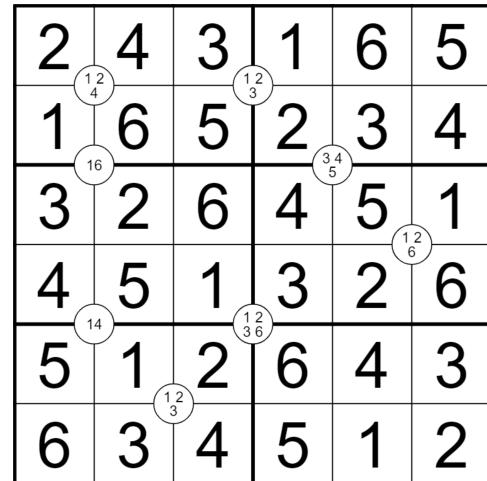
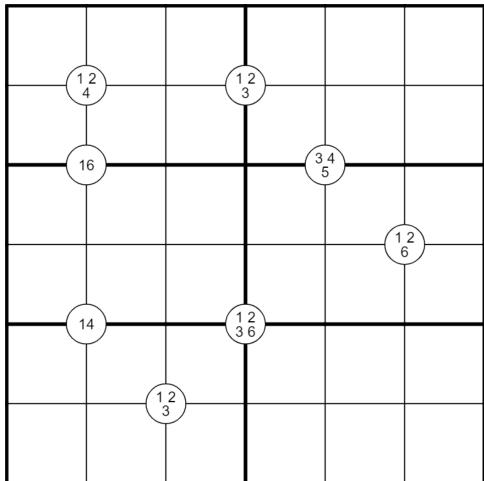
[Beginner/Experienced] Difference or Greater 6x6:

Normal 6x6 sudoku rules apply. Numbers in white circles equal either the difference between the two adjoining digits, or the greater of the two adjoining digits.



[Beginner/Experienced] Quadruples 6x6:

Normal 6x6 sudoku rules apply. Digits in white circles must appear somewhere in the four cells immediately surrounding their circle.



[Beginner/Experienced] Thermo 6x6:

Normal 6x6 sudoku rules apply. Digits along thermometers must strictly increase from the round bulb to the tip. (*Example is 9x9, but contest puzzle will be 6x6*)

1								4
	3					2		
		5						
				1				
					5			
	4					3		
2								1

1	2	9	8	7	6	3	5	4
8	3	7	5	9	4	1	2	6
4	6	5	3	2	1	7	8	9
5	1	4	9	8	3	2	6	7
3	7	8	6	1	2	4	9	5
6	9	2	7	4	5	8	1	3
9	8	3	1	6	7	5	4	2
7	4	1	2	5	9	6	3	8
2	5	6	4	3	8	9	7	1

[Beginner/Experienced] No 3 in a Row 6x6:

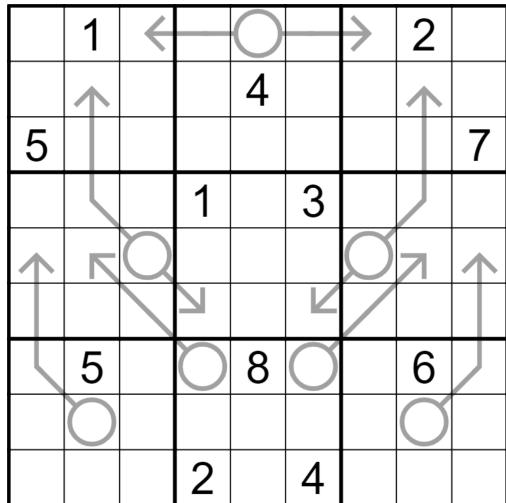
Normal 6x6 sudoku rules apply. No set of 3 adjacent digits in a row or column may be all odd or all even.

1		3		2	
	4		5		6
	5		1		3

1	6	3	4	2	5
2	5	4	3	6	1
3	4	2	5	1	6
6	1	5	2	4	3
5	2	1	6	3	4
4	3	6	1	5	2

[Beginner/Experienced] Arrow 6x6:

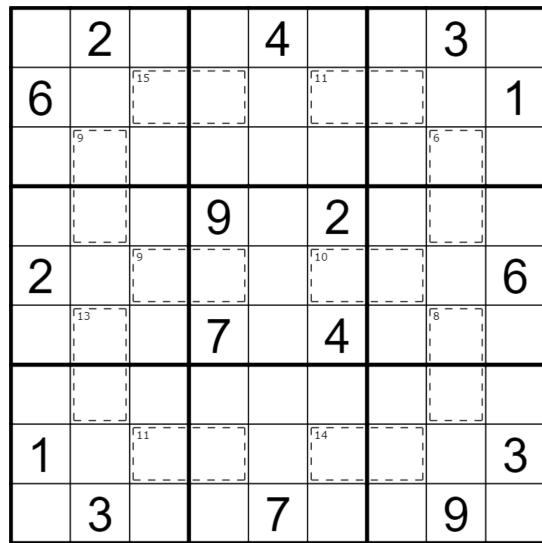
Normal 6x6 sudoku rules apply. Digits along an arrow sum to the value in the adjoining circle. Digits may repeat along an arrow if permitted by Sudoku rules. (*Example is 9x9, but contest puzzle will be 6x6*)



7	1	6	3	9	5	4	2	8
9	3	2	8	4	7	5	1	6
5	4	8	6	2	1	9	3	7
8	2	5	1	7	3	6	4	9
3	6	9	4	5	2	8	7	1
4	7	1	9	6	8	2	5	3
2	5	3	7	8	9	1	6	4
1	9	4	5	3	6	7	8	2
6	8	7	2	1	4	3	9	5

[Experienced] Killer 6x6:

Normal 6x6 sudoku rules apply. Digits in cages may not repeat and must sum to the indicated number. (*Example is 9x9, but contest puzzle will be 6x6*)



9	2	8	1	4	5	6	3	7
6	5	7	8	3	9	2	4	1
4	1	3	6	2	7	9	5	8
7	8	5	9	6	2	3	1	4
2	9	4	5	1	3	7	8	6
3	6	1	7	8	4	5	2	9
8	7	2	3	9	1	4	6	5
1	4	9	2	5	6	8	7	3
5	3	6	4	7	8	1	9	2

[Experienced] Thermo:

Normal 9x9 sudoku rules apply. Digits along thermometers must strictly increase from the round bulb to the tip.

1								4
	3				2			
		5						
				1				
					5			
						3		
2							1	

1	2	9	8	7	6	3	5	4
8	3	7	5	9	4	1	2	6
4	6	5	3	2	1	7	8	9
5	1	4	9	8	3	2	6	7
3	7	8	6	1	2	4	9	5
6	9	2	7	4	5	8	1	3
9	8	3	1	6	7	5	4	2
7	4	1	2	5	9	6	3	8
2	5	6	4	3	8	9	7	1

[Experienced] Either/Or:

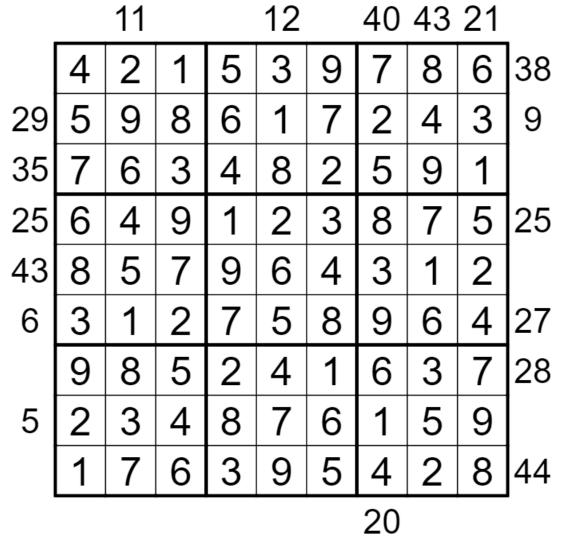
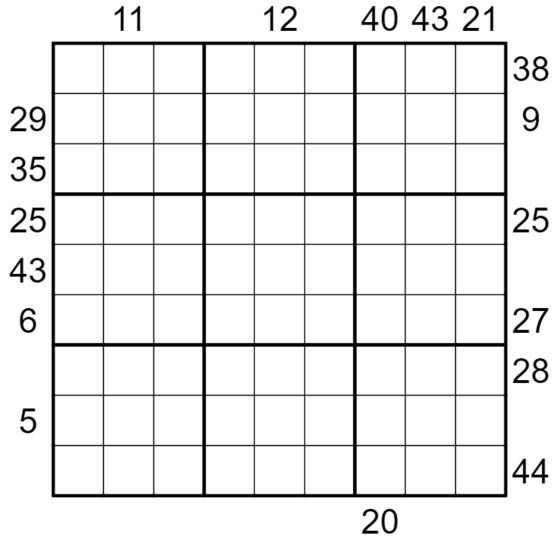
Normal 9x9 sudoku rules apply. A digit in a white circle must appear in one of the two cells touching that circle.

(1)			(4)		(5)		(1)	
(2)		(4)		(8)		(7)		(3)
(3)				(8)	(7)	(6)	(5)	
(4)					(6)	(9)		(5)
(5)					(1)	(4)		(6)
(6)						(1)		(7)
(7)						(2)		
(8)						(4)	(8)	
(9)							(9)	

9	7	6	4	3	5	8	1	2
1	4	5	6	8	2	9	7	3
2	3	8	9	1	7	6	5	4
3	2	1	7	6	8	4	9	5
4	8	7	1	5	9	2	3	6
5	6	9	2	4	3	1	8	7
6	5	4	3	9	1	7	2	8
7	1	3	8	2	6	5	4	9
8	9	2	5	7	4	3	6	1

[Experienced] X-Sums:

Normal 9x9 sudoku rules apply. Clues outside of the grid give the sum of the first N digits in their row or column (counting from the direction of the clue), where N is the first digit in that row or column (nearest to the clue)



Variant Round II

Beginner Points:

Prime Sums	9
Ratio	8
Arrow	18
Killer	18
Antiknight	13
Extra Regions	13
Little Killer	10
Palindrome	11
Total	100

Experienced Points:

Arrow	8
Killer	9
Antiknight	9
Extra Regions	6
Little Killer	9
Palindrome	6
Sandwich Sums	16
Entropic Line	15
Region Sum Line	13
First Seen Odd/Even	9
Total	100

Variant Round II Rules

Normal 9x9 Rules: Place the digits 1-9 in the empty squares in the grid, such that every row, column, and marked 3x3 square contains each of the digits exactly once.

[Beginner] Prime Sums:

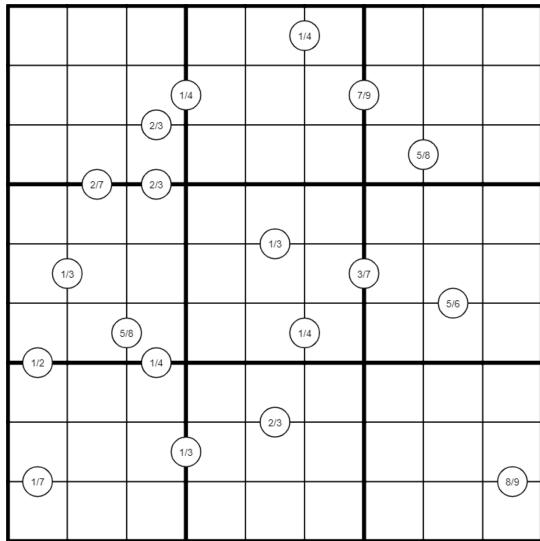
Normal 9x9 sudoku rules apply. Pairs of numbers marked with boxes must add to a prime number.
(Example is 6x6, but contest puzzle will be 9x9)

	6					
2		5				
	3		4			
		4		3		
			5		2	
				6		

3	6	1	2	5	4	
2	4	5	6	1	3	
1	3	6	4	2	5	
5	2	4	1	3	6	
6	1	3	5	4	2	
4	5	2	3	6	1	

[Beginner] Ratio:

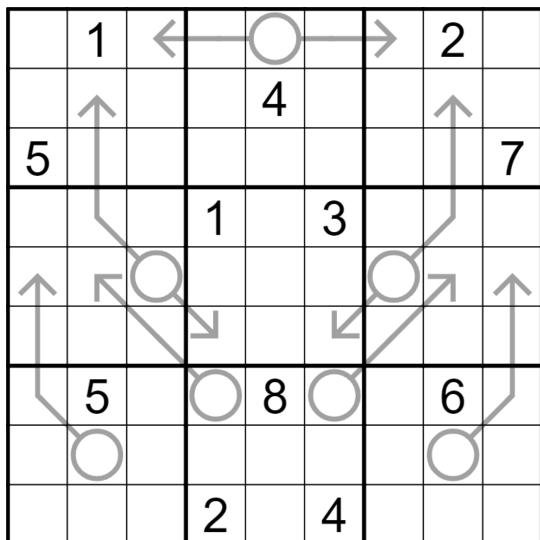
Normal 9x9 sudoku rules apply. Ratios between pairs of numbers (smaller number over greater number) are marked.



5	1	7	6	8	2	4	9	3
8	3	4	1	5	9	7	2	6
9	2	6	4	7	3	5	8	1
4	7	9	5	3	6	8	1	2
2	6	1	8	9	7	3	5	4
3	5	8	2	1	4	9	6	7
6	9	2	7	4	8	1	3	5
1	4	3	9	6	5	2	7	8
7	8	5	3	2	1	6	4	9

[Beginner/Experienced] Arrow:

Normal 9x9 sudoku rules apply. Digits along an arrow sum to the value in the adjoining circle. Digits may repeat along an arrow if permitted by Sudoku rules.



7	1	6	3	9	5	4	2	8
9	3	2	8	4	7	5	1	6
5	4	8	6	2	1	9	3	7
8	2	5	1	7	3	6	4	9
3	6	9	4	5	2	8	7	1
4	7	1	9	6	8	2	5	3
2	5	3	7	8	9	1	6	4
1	9	4	5	3	6	7	8	2
6	8	7	2	1	4	3	9	5

[Beginner/Experienced] Killer:

Normal 9x9 sudoku rules apply. Digits in cages may not repeat and must sum to the indicated number.

9	2	8	1	4	5	6	3	7
6	5	7	8	3	9	2	4	1
4	1	3	6	2	7	9	5	8
7	8	5	9	6	2	3	1	4
2	9	4	5	1	3	7	8	6
3	6	1	7	8	4	5	2	9
8	7	2	3	9	1	4	6	5
1	4	9	2	5	6	8	7	3
5	3	6	4	7	8	1	9	2

	2			4			3	
6								1
2								6
1								3
	3				7			9

[Beginner/Experienced] Antiknight:

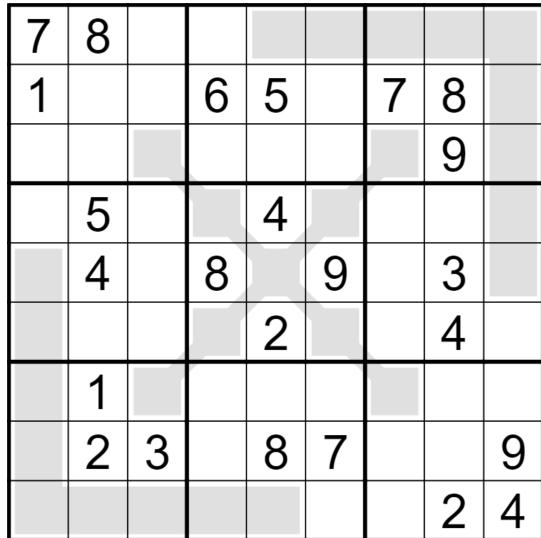
Normal 9x9 sudoku rules apply. The same digit may not appear a chess knight's move away from itself.

		4				7		
		1		2				
	5		3		6			
						8		
	8					9		
	6							
	3		8		2			
		9		7				
	1				8			

1	3	4	6	5	8	7	9	2
7	8	6	1	9	2	4	3	5
2	9	5	7	3	4	6	1	8
4	2	9	3	7	6	5	8	1
3	1	8	4	2	5	9	7	6
5	6	7	8	1	9	3	2	4
6	7	3	5	8	1	2	4	9
8	4	2	9	6	7	1	5	3
9	5	1	2	4	3	8	6	7

[Beginner/Experienced] Extra Regions:

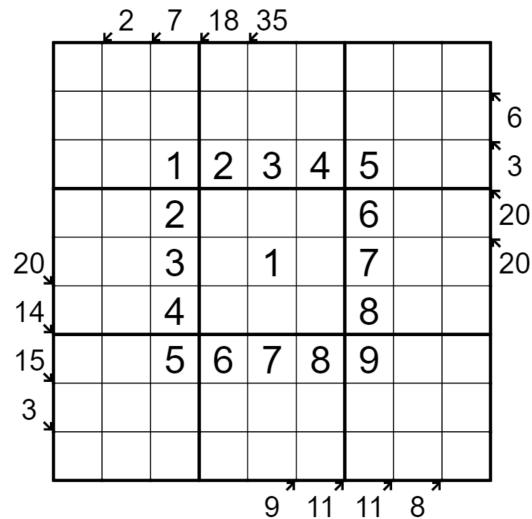
Normal 9x9 sudoku rules apply. The digits 1-6 must appear exactly once in each shaded region.



7	8	6	2	9	4	1	5	3
1	9	4	6	5	3	7	8	2
5	3	2	1	7	8	4	9	6
9	5	7	3	4	1	2	6	8
2	4	1	8	6	9	5	3	7
3	6	8	7	2	5	9	4	1
6	1	9	4	3	2	8	7	5
4	2	3	5	8	7	6	1	9
8	7	5	9	1	6	3	2	4

[Beginner/Experienced] Little Killer:

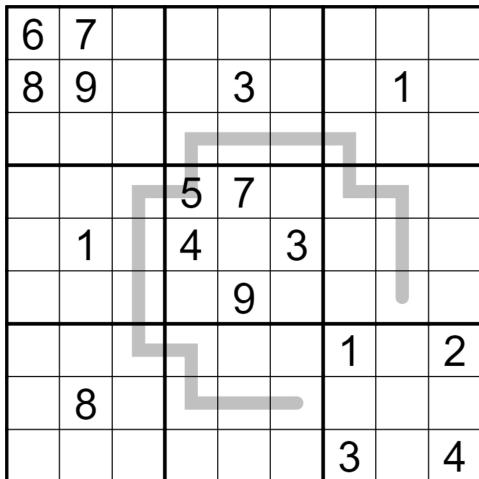
Normal 9x9 sudoku rules apply. Numbers with arrows indicate the sum of the numbers in that direction.



2	7	18	35					
2	3	7	9	8	5	4	1	6
4	5	8	7	6	1	3	9	2
6	9	1	2	3	4	5	8	7
9	1	2	8	5	7	6	3	4
5	8	3	4	1	6	7	2	9
7	6	4	3	2	9	8	5	1
1	2	5	6	7	8	9	4	3
8	4	6	1	9	3	2	7	5

[Beginner/Experienced] Palindrome:

Normal 9x9 sudoku rules apply. Numbers along shaded lines must be the same forwards and backwards.



6	7	3	1	4	5	2	9	8
8	9	5	6	3	2	4	1	7
1	2	4	9	8	7	6	5	3
2	4	9	5	7	1	8	3	6
5	1	8	4	6	3	7	2	9
3	6	7	2	9	8	5	4	1
4	3	6	8	5	9	1	7	2
7	8	1	3	2	4	9	6	5
9	5	2	7	1	6	3	8	4

[Experienced] Sandwich Sums:

Normal 9x9 sudoku rules apply. Numbers at ends of rows and columns represent the sum of digits in between 1 and 9 (non-inclusive) in that row or column.

20	20	0	22	14	22	20	30	2
8								
29	1					9		
35								
7								
28								
7								
5								
21	9					1		
2								

20	20	0	22	14	22	20	30	2
8	3	7	4	1	8	9	5	2
29	2	1	8	3	6	5	7	9
35	9	5	6	2	7	4	3	8
7	8	6	3	4	9	7	1	5
28	5	2	1	8	3	6	4	7
7	7	4	9	5	2	1	8	6
5	1	3	2	9	5	8	6	4
21	6	9	5	7	4	3	2	1
2	4	8	7	6	1	2	9	3

[Experienced] Entropic Line:

Normal 9x9 sudoku rules apply. Along the gray line, every group of three adjacent cells must contain exactly one low (123), one medium (456), and one high (789) digit.

6							2	
	1				4			
8		1			9			
4						5		
	7				2			
8	1			3	4			

6	5	8	1	9	4	7	3	2
2	1	7	6	5	3	9	4	8
9	4	3	2	7	8	5	6	1
7	9	4	5	3	2	1	8	6
5	8	2	7	1	6	4	9	3
1	3	6	8	4	9	2	5	7
4	2	9	3	6	7	8	1	5
3	7	5	4	8	1	6	2	9
8	6	1	9	2	5	3	7	4

[Experienced] Region Sum Line:

Normal 9x9 sudoku rules apply. Along the gray line, the digits in each region of the grid have the same sum.

9			2				5	
							8	
		2						
7	3				2	1		
			3					
6								

9	1	6	8	2	7	3	4	5
4	2	3	5	9	6	1	8	7
5	7	8	3	4	1	2	6	9
1	8	9	2	5	4	7	3	6
7	3	4	9	6	8	5	2	1
6	5	2	1	7	3	8	9	4
8	4	5	6	1	2	9	7	3
3	6	1	7	8	9	4	5	2
2	9	7	4	3	5	6	1	8

[Experienced] First Seen Odd/Even:

Normal 9x9 sudoku rules apply. Clues outside of the grid give the first odd or first even value in that row or column, starting from the direction of the clue.

	1	7	3	9	1	7	9	
4								4
7		1	2	3	4	5		5
3		7			6			3
9		6			7			9
5		5			8			5
5		4	3	2	1	9		9
8								2
3								

4 9 4 1 9 6 5

	1	7	3	9	1	7	9		
4	3	5	8	7	6	9	1	2	4
7	4	6	2	1	8	5	3	7	9
3	7	9	1	2	3	4	5	8	6
9	8	3	7	4	9	2	6	5	1
5	9	1	6	8	5	3	7	4	2
5	2	4	5	6	1	7	8	9	3
5	5	7	4	3	2	1	9	6	8
8	1	8	9	5	4	6	2	3	7
3	6	2	3	9	7	8	4	1	5

4 9 4 1 9 6 5

Beginner Team Round

9x9 Rules: Place the digits 1-9 in the empty squares in the grid, such that every row, column, and marked 3x3 square contains each of the digits exactly once.

Rules for the first four rounds: Every team will get a set of 4 puzzles, all of which will have shaded cells. The corresponding shaded cells must have the same value across all 4 puzzles, unless otherwise indicated.

Rules for the last round: 4 puzzles will have a single shaded box in the center, with the last puzzle having 4 shaded boxes. Each of the 4 puzzles are stand alone puzzles that can be solved on their own. Each of the 4 shaded boxes in the last puzzle can be paired to a different shaded box from the 4 standalone puzzles, such that digits in the same place within each pairing of shaded boxes must be identical. The exact pairings must be deduced by each team.

When your team finishes a round, bring it up to the judges' table – it must be correct to obtain the next round. Points are determined by the number of puzzles solved correctly.

Experienced Team Round

6x6 Rules: Place the digits 1-6 in the empty squares in the grid, such that every row, column, and marked 2x3 square contains each of the digits exactly once.

9x9 Rules: Place the digits 1-9 in the empty squares in the grid, such that every row, column, and marked 3x3 square contains each of the digits exactly once.

Normal Sudoku rules apply in each grid. The following additional rules also apply for specific grids.

- A: Digits in each cage may not repeat and must sum to the indicated total.
- B: Digits along each thermometer must strictly increase from the round bulb to the tip.
- C: Digits along arrows must sum to the digit in the attached circle.
- D: Digits separated by a white dot are consecutive. Digits separated by a black dot are in a 1:2 ratio. Not all possible dots are necessarily given.
- E: Digits in a white circle must appear somewhere in the four cells immediately surrounding that circle.
- F: Digits separated by an X sum to 10. Digits separated by a V sum to 5. Not all possible clues are necessarily given.

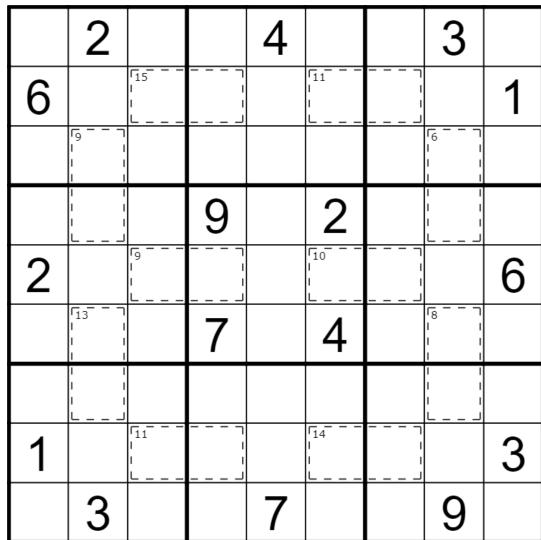
The six grids form a loop (A-B-C-D-E-F-A) in which each grid has two immediate neighbors. In each pair of neighboring grids, exactly one of the nine 3x3 regions contains an identical arrangement of digits. For instance, region 4 might be identical in grids A and B. Which regions match between grids must be determined by the solvers.

Points are determined as so:

- Each 6x6 grid correct in the smaller version is worth 1 point.
- The correct completed smaller version is worth an additional 3 points.
- Each 3x3 square correct in the larger version is worth 1 point.
- Each correct completed 9x9 grid in the larger version is worth an additional 5 points.
- The correct completed larger version is worth an additional 15 points.

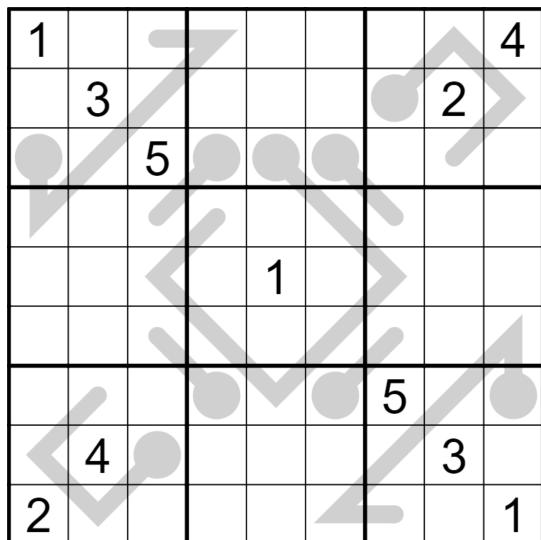
Example Puzzles (not in a loop)

A: Digits in each cage may not repeat and must sum to the indicated total.



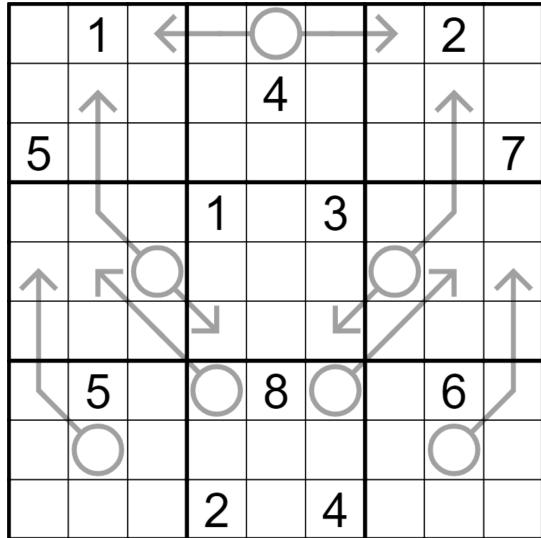
9	2	8	1	4	5	6	3	7
6	5	7	8	3	9	2	4	1
4	1	3	6	2	7	9	5	8
7	8	5	9	6	2	3	1	4
2	9	4	5	1	3	7	8	6
3	6	1	7	8	4	5	2	9
8	7	2	3	9	1	4	6	5
1	4	9	2	5	6	8	7	3
5	3	6	4	7	8	1	9	2

B: Digits along each thermometer must strictly increase from the round bulb to the tip.



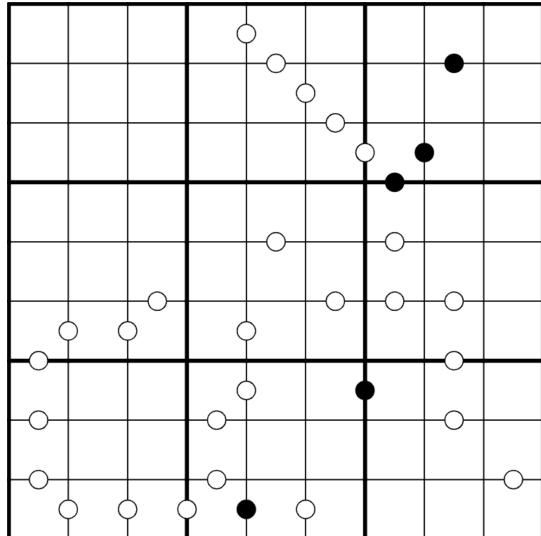
1	2	9	8	7	6	3	5	4
8	3	7	5	9	4	1	2	6
4	6	5	3	2	1	7	8	9
5	1	4	9	8	3	2	6	7
3	7	8	6	1	2	4	9	5
6	9	2	7	4	5	8	1	3
9	8	3	1	6	7	5	4	2
7	4	1	2	5	9	6	3	8
2	5	6	4	3	8	9	7	1

C: Digits along arrows must sum to the digit in the attached circle.



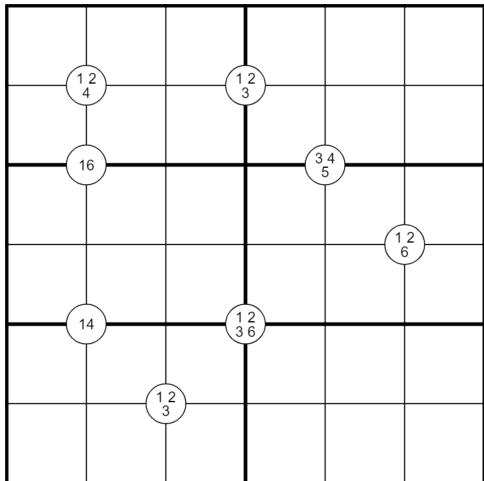
7	1	6	3	9	5	4	2	8
9	3	2	8	4	7	5	1	6
5	4	8	6	2	1	9	3	7
8	2	5	1	7	3	6	4	9
3	6	9	4	5	2	8	7	1
4	7	1	9	6	8	2	5	3
2	5	3	7	8	9	1	6	4
1	9	4	5	3	6	7	8	2
6	8	7	2	1	4	3	9	5

D: Digits separated by a white dot are consecutive. Digits separated by a black dot are in a 1:2 ratio. Not all possible dots are necessarily given.



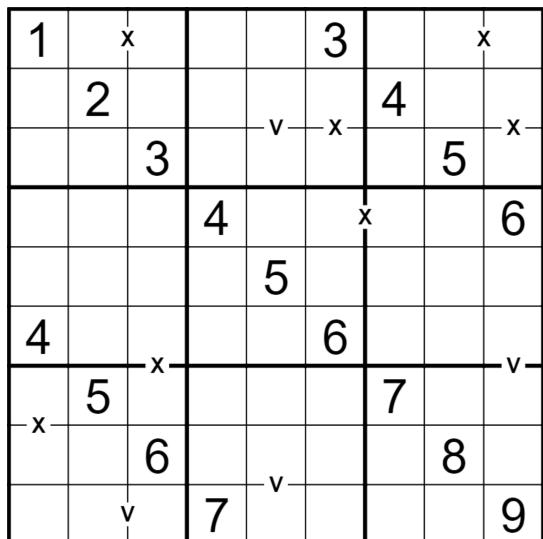
6	5	3	9	8	4	7	2	1
9	2	1	3	7	6	8	4	5
7	4	8	2	1	5	6	3	9
8	9	6	1	2	7	3	5	4
1	7	5	4	3	8	2	9	6
2	3	4	5	6	9	1	8	7
3	1	9	6	5	2	4	7	8
4	8	2	7	9	1	5	6	3
5	6	7	8	4	3	9	1	2

E: Digits in a white circle must appear somewhere in the four cells immediately surrounding that circle.



2	4	3	1	6	5
1	6	5	2	3	4
3	2	6	4	5	1
4	5	1	3	2	6
5	1	2	6	4	3
6	3	4	5	1	2

F: Digits separated by an X sum to 10. Digits separated by a V sum to 5. Not all possible clues are necessarily given.



1	6	x	4	5	7	3	9	2	x	8
5	2	7	9	1	8	4	6	3	x	
9	8	3	6	4	2	1	5	7		
2	1	5	4	8	7	x	3	9	6	
6	7	9	3	5	1	8	4	2		
4	3	8	2	9	6	5	7	1	v	
3	5	2	8	6	9	7	1	4		
7	9	6	1	3	4	2	8	5		
8	4	v	1	7	2	5	6	3	9	