

# MIT Sudoku Open 2024

M								
	I			S	U	D		
		T			O	K	U	
			S					
S				U		M	I	T
U					D			
D				M		O		
O		U			I		K	
	K					T		U

Instruction Booklet

## Schedule

10:00 – 10:40	Round 1: Classics	500 Points
10:50 – 11:40	Round 2: Variants I	1000 Points
12:30 – 13:20	Round 3: Variants II	1000 Points
13:30 – 14:00*	Team Round 1: Pants on Fire	800 Points
14:15 – 15:15*	Team Round 2: Force/Acceleration	1600 Points

## Competition Rules & Comments

### **Scoring & Bonuses**

Full points will be awarded only for fully and corrected solved puzzles. By graders' discretion, partial credit of 90% and 80% will be given for puzzles with 1 or 2 minor mistakes, respectively.

A bonus of 10 points for every full minute remaining will be awarded to any competitor who correctly solves all puzzles in an individual round. A partial 60% bonus can be awarded if one puzzle is incorrectly solved, under the condition that the puzzle is solved completely or almost completely and the competitor may have believed their solution to be correct. In case of doubt, decision will be made with graders' discretion.

A bonus of 40 points for every full minute remaining will be awarded to any team who correctly solves all puzzles in a round, with the same schematic as the individual bonus system above.

To declare completion of a round, a competitor must close their booklet and clearly state "finished" and raise their arm with the booklet. Same applies with team rounds.

### **Dishonesty Statement**

Please no cheating everyone, you all are literally here on a Saturday doing sudoku for the sake of enjoying puzzles, why would you cheat at this, it makes no sense whatsoever.

### **Acknowledgements**

Special thanks to MIT, since we would be solving sudoku outdoors without their indoor facilities.

# Individual Round 1: Classics

## 40 Minutes – 500 Points

1.1 Classic Sudoku.....	7 Points
1.2 Classic Sudoku.....	11 Points
1.3 Classic Sudoku.....	11 Points
1.4 Classic Sudoku.....	11 Points
1.5 Classic Sudoku.....	15 Points
1.6 Classic Sudoku.....	15 Points
1.7 Classic Sudoku.....	15 Points
1.8 Classic Sudoku.....	25 Points
1.9 Classic Sudoku.....	30 Points
1.10 Classic Sudoku.....	40 Points
1.11 Classic Sudoku.....	40 Points
1.12 Classic Sudoku.....	50 Points
1.13 Classic Sudoku.....	50 Points
1.14 Classic Sudoku.....	60 Points
1.15 Classic Sudoku.....	60 Points
1.16 Classic Sudoku.....	60 Points

### 1.1 – 1.21: Classic Sudoku

Rules: Place the digits 1-9 (or 1-6) in each empty cell in the grid such that each row, column, and marked 3x3 box (or 2x3 box) contains each digit exactly once. [Online Solving](#)

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

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

## Individual Round 2: Variants I

**50 Minutes – 1000 Points**

2.1 Antiknight Sudoku .....	20 Points
2.2 Antiknight Sudoku .....	130 Points
2.3 Consecutive Pairs Sudoku.....	50 Points
2.4 Consecutive Pairs Sudoku.....	100 Points
2.5 Irregular Sudoku.....	20 Points
2.6 Irregular Sudoku.....	80 Points
2.7 Killer Sudoku .....	16 Points
2.8 Killer Sudoku .....	130 Points
2.9 Kropki Lines Sudoku.....	28 Points
2.10 Kropki Lines Sudoku.....	100 Points
2.11 Odd/Even Sudoku .....	20 Points
2.12 Odd/Even Sudoku .....	60 Points
2.13 Renban Sudoku .....	20 Points
2.14 Renban Sudoku .....	140 Points
2.15 X-Sums Sudoku.....	36 Points
2.16 X-Sums Sudoku.....	50 Points

### 2.1 – 2.2: Antiknight Sudoku

**20+130 Points**

Rules: Apply Classic Sudoku rules. Cells that can be reached by a knight step (chess) cannot contain the same digit. [Online Solving](#)

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

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

### 2.3 – 2.4: Consecutive Pairs Sudoku

50+100 Points

Rules: Apply Classic Sudoku rules. If a circle is given between two adjacent cells, then the digits in those cells must be consecutive. Not all circles are given. [Online Solving](#)

	○	○		○				
○				○		4		
○			○	○	○		6	
			○					
○			○					
○								
			○					
2		○	○	○	○			
		8						
				○				
					○			

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

### 2.5 – 2.6: Irregular Sudoku

20+80 Points

Rules: Each row, column, and outlined region must include the digits 1-9 once, with no repeats. [Online Solving](#)

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

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

## 2.7 – 2.8: Killer Sudoku

16+130 Points

Rules: Classic sudoku rules apply. The number at the top-left corner of each cage equals the sum of digits inside the cage. Digits do not repeat inside a cage. [Online Solving](#)

	2			4			3	
6		<sup>15</sup>			<sup>11</sup>			1
	<sup>9</sup>						<sup>6</sup>	
		9		2				
2		<sup>9</sup>			<sup>10</sup>			6
	<sup>13</sup>		7	4			<sup>8</sup>	
1		<sup>11</sup>			<sup>14</sup>			3
	3			7				9

9	2	8	1	4	5	6	3	7
6	5	<sup>15</sup>	7	8	3	<sup>11</sup>	9	2
4	<sup>9</sup>	1	3	6	2	7	9	<sup>6</sup>
7	8	5	9	6	2	3	1	4
2	9	<sup>9</sup>	4	5	1	<sup>10</sup>	3	7
3	<sup>13</sup>	6	1	7	8	4	5	<sup>8</sup>
8	7	2	3	9	1	4	6	5
1	4	<sup>11</sup>	9	2	5	<sup>14</sup>	6	8
5	3	6	4	7	8	1	9	2

## 2.9 – 2.10: Kropki Lines Sudoku

28+100 Points

Rules: Classic sudoku rules apply. Adjacent digits on grey lines either differ by 1, or form a 1:2 ratio. Not all possible lines are drawn. [Online Solving](#)

9								1
	7							6
		7				5		

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

### 2.11 – 2.12: Odd/Even Sudoku

20+60 Points

Rules: Classic sudoku rules apply. Digits in circles must be odd and digits in squares must be even. [Online Solving](#)

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

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

### 2.13 – 2.14: Renban Sudoku

20+140 Points

Rules: Classic sudoku rules apply. Gray lines must contain a set of distinct, consecutive digits in any order. [Online Solving](#)

			2		1			
		9						
6			8				9	
				4				
	4		3					
1								

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





## Individual Round 3: Variants II

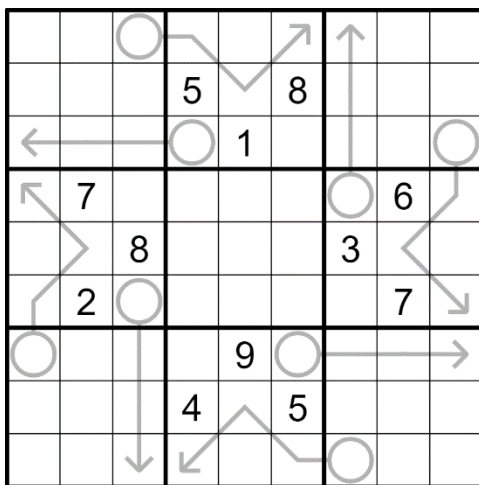
**50 Minutes – 1000 Points**

3.1 Arrow Sudoku.....	28 Points
3.2 Arrow Sudoku.....	120 Points
3.3 Distanced Alternating Lines Sudoku.....	20 Points
3.4 Distanced Alternating Lines Sudoku.....	112 Points
3.5 Equal Sums Sudoku.....	36 Points
3.6 Equal Sums Sudoku.....	60 Points
3.7 Hidden Dihedral Shape Sudoku.....	40 Points
3.8 Hidden Dihedral Shape Sudoku.....	72 Points
3.9 Palindrome Sudoku.....	28 Points
3.10 Palindrome Sudoku.....	50 Points
3.11 Quadruples Sudoku.....	50 Points
3.12 Quadruples Sudoku.....	48 Points
3.13 Thermo Sudoku.....	40 Points
3.14 Thermo Sudoku.....	50 Points
3.15 Untouch Sudoku.....	20 Points
3.16 Untouch Sudoku.....	36 Points
3.17 Twin Clones Sudoku.....	160 Points

### 3.1 – 3.2: Arrow Sudoku

**28+120 Points**

Rules: Apply Classic Sudoku rules. Each digit placed in a cell with a circle must be the sum of the digits placed in the cells that the adjoining arrow passes through. Digits may repeat on arrow. [Online Solving](#)



### 3.3 – 3.4: Distanced Alternating Lines

20+112 Points

Rules: Classic sudoku rules apply. Adjacent digits on grey lines must have different parity, and have a difference of at least 3. [Online Solving](#)

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

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

### 3.5 – 3.6: Equal Sums Sudoku

36+60 Points

Rules: Apply Classic Sudoku rules. The sum of the digits on each shape are the same for each all shapes. [Online Solving](#)

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

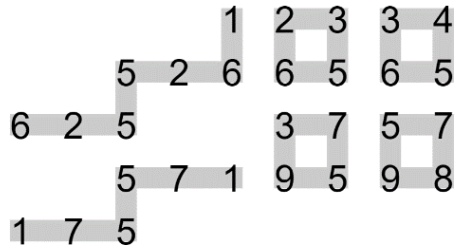
8	2	5	7	3	6	1	9	4
1	9	3	5	4	8	2	6	7
6	4	7	1	9	2	5	8	3
3	5	1	9	6	7	8	4	2
9	7	8	2	5	4	6	3	1
4	6	2	3	8	1	9	7	5
2	1	4	8	7	9	3	5	6
7	3	9	6	1	5	4	2	8
5	8	6	4	2	3	7	1	9

### 3.7 – 3.8: Hidden Dihedral Shape

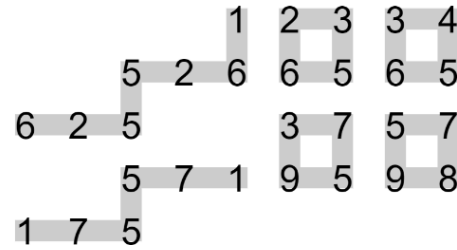
40+72 Points

Rules: Classic sudoku rules apply. There are some numbered shapes that must be put into the grid. Shapes can be rotated (in 45 degree increments) AND reflected. Different shapes may not intersect each other or share cells. [Online Solving](#)

	1			2			3	
	4			5			6	
	7			8			9	



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



### 3.9 – 3.10: Palindrome Sudoku

28+50 Points

Rules: Classic sudoku rules apply. Numbers along shaded lines must be the same forwards and backwards. [Online Solving](#)

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

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



### 3.15 – 3.16: Untouch Sudoku

20+36 Points

Rules: Classic sudoku rules apply. Diagonally adjacent digits must be different. [Online Solving](#)

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

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

### 3.17: Twin Clones Sudoku

160 Points

Rules: Classic sudoku rules apply. Additionally, the numbers in each shaded region in the first grid must correspond to another shaded region in the second grid. The correspondence of which regions match to which other regions must be determined when solving the puzzle. Regions cannot be rotated or reflected. 75% of total points will be awarded for 1 of the 2 grids fully and correctly completed. [Online Solving](#)

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

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

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

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

\*Example from WSC 2023 IB

# Team Round 1: Pants on Fire

**30 Minutes\* – 800 Points**

4.1 Pants on Fire Sudoku .....	100 Points
4.2 Pants on Fire Sudoku .....	100 Points
4.3 Pants on Fire Sudoku .....	100 Points
4.4 Pants on Fire Sudoku .....	100 Points
4.5 Pants on Fire Sudoku .....	100 Points
4.6 Pants on Fire Sudoku .....	100 Points
4.7 Pants on Fire Sudoku .....	100 Points
4.8 Pants on Fire Sudoku .....	100 Points

\*Approximate time; team rounds will be run for max(30 minutes, 2<sup>nd</sup> submission + 5 minutes)

## 4.1-8: Pants on Fire Sudoku

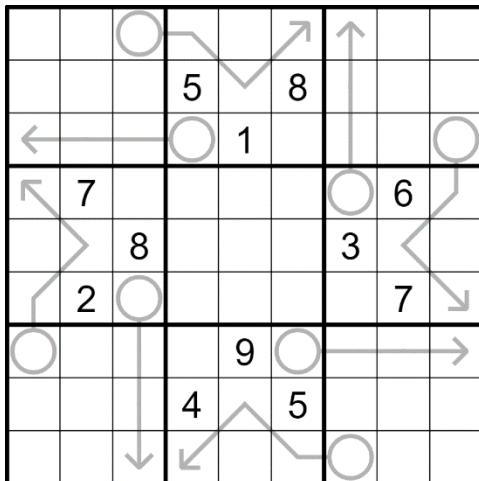
**8 \* 100 Points**

Each of the eight grids contain clues belonging to the following 8 sudoku variants: Thermo, Arrow, Killer, Little Killer, Odd/Even, XV Pairs, Kropki Pairs, Palindrome. Some clues are liars, where liars are not allowed to follow their variant's rules. In each grid, all liar clues belong to the same variant, and the same variant may not be a liar in two different grids.

### Variants & Rules

#### Arrow Sudoku

Rules: Apply Classic Sudoku rules. Each digit placed in a cell with a circle must be the sum of the digits placed in the cells that the adjoining arrow passes through. Digits may repeat on arrow. [Online Solving](#)







## Kropki Pairs Sudoku

Rules: Classic sudoku rules apply. A white dot between two cells indicates that the digits in those two cells are consecutive. A black dot between two cells indicates that the digits in those two cells form a 1:2 ratio. Not all dots are given. [Online Solving](#)

1								9

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

## Odd/Even Sudoku

Rules: Classic sudoku rules apply. Digits in circles must be odd and digits in squares must be even. [Online Solving](#)

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

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

## Palindrome Sudoku

Rules: Classic sudoku rules apply. Numbers along shaded lines must be the same forwards and backwards.

[Online Solving](#)

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

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

## Thermo Sudoku

Rules: Classic sudoku rules apply. Some thermometer shapes are placed in the grid. Digits are strictly increasing from the round bulb of each thermometer to each flat end.

[Online Solving](#)

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



## Team Round 2: Force/Acceleration

**60 Minutes – 1600 Points**

5.1 Classic Sudoku.....	80 Points
5.2 Classic Sudoku.....	80 Points
5.3 Classic Sudoku.....	80 Points
5.4 Classic Sudoku.....	80 Points
5.5 Classic Sudoku.....	80 Points
5.6 Classic Sudoku.....	80 Points
5.7 Classic Sudoku.....	80 Points
5.8 Classic Sudoku.....	80 Points
5.9 Antiknight Sudoku.....	80 Points
5.10 Antiknight Sudoku.....	80 Points
5.11 Arrow Sudoku.....	80 Points
5.12 Arrow Sudoku.....	80 Points
5.13 Killer Sudoku.....	80 Points
5.14 Killer Sudoku.....	80 Points
5.15 Kropki Pairs Sudoku.....	80 Points
5.16 Kropki Pairs Sudoku.....	80 Points
5.17 Odd/Even Sudoku.....	80 Points
5.18 Odd/Even Sudoku.....	80 Points
5.19 Thermo Sudoku.....	80 Points
5.20 Thermo Sudoku.....	80 Points

\*Approximate time; team rounds will be run for max(60 minutes, 2<sup>nd</sup> submission + 5 minutes)

### **Setup**

This is a 20-grid samurai, with assorted variants & classic sudokus. The following variants will be included: Antiknight, Arrow, Killer, Kropki Pairs, Odd/Even, Thermo. The layout of the entire grid and the location of each variant on said grid will be displayed throughout the entire team round. Overlapping regions may have multiple variants, in which the specific variant mechanics is self-contained within its respective 9x9 grid (e.g. Antiknight restrictions for overlapping regions only apply to other digits within the 9x9 Antiknight grid). Additionally, dotted lines connecting two cells indicate that those two cells have the same digit.

### **Scoring**

Each of the 20 9x9 grids will be graded independently. As mentioned in the introductory portion, 1 minor error will lead to 90% partial credit for 1 of the 9x9 grids. If the error occurs within an overlapping region, then appropriate deductions are made for both 9x9 grids.

### 5.1-8: Classic Sudoku

80+80+80+80+80+80+80+80 Points

Rules: Place the digits 1-9 in each empty cell in the grid such that each row, column, and marked 3x3 box contains each digit exactly once. [Online Solving](#)

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

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

### 5.9-10: Antiknight Sudoku

80+80 Points

Rules: Apply Classic Sudoku rules. Cells that can be reached by a knight step (chess) cannot contain the same digit. [Online Solving](#)

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

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

### 5.11-12: Arrow Sudoku

80+80 Points

Rules: Apply Classic Sudoku rules. Each digit placed in a cell with a circle must be the sum of the digits placed in the cells that the adjoining arrow passes through. Digits may repeat on arrow. [Online Solving](#)

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

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

### 5.13-14: Killer Sudoku

80+80 Points

Rules: Classic sudoku rules apply. The number at the top-left corner of each cage equals the sum of digits inside the cage. Digits do not repeat inside a cage. [Online Solving](#)

	2			4				3
6		15			11			1
		9						6
			9		2			
2		9			10			6
		13		7		4		8
1		11			14			3
	3			7				9

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

### 5.15-16: Kropki Pairs Sudoku

80+80 Points

Rules: Classic sudoku rules apply. A white dot between two cells indicates that the digits in those two cells are consecutive. A black dot between two cells indicates that the digits in those two cells form a 1:2 ratio. Not all dots are given. [Online Solving](#)

1								9

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

### 5.17-18: Odd/Even Sudoku

80+80 Points

Rules: Classic sudoku rules apply. Digits in circles must be odd and digits in squares must be even. [Online Solving](#)

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

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

## 5.19-20: Thermo Sudoku

80+80 Points

Rules: Classic sudoku rules apply. Some thermometer shapes are placed in the grid. Digits are strictly increasing from the round bulb of each thermometer to each flat end. [Online Solving](#)

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