

# SUDOKU BY STEPS

## LEVEL 1

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# Rules of Sudoku

You begin with a partially completed grid. Complete all the other cells of the grid with the integers 1 to 9 such that each row, column, and box (3×3 regions bordered by thick lines) contains a single instance of all the integers from 1 to 9.

## Methods of Solving Sudoku

The 2 basic methods for solving Sudoku are: Integer Elimination and Cell Elimination, as explained below.

### 1. Integer Elimination

Since each of the rows, columns and boxes (collectively called units) can only have a single instance of each integer, you can use elimination to figure out what integer a cell should have. You look at an empty cell and all the units it belongs to, and eliminate all the integers found in those units. If only one integer remains, that integer belongs in the cell; you can thus fill it in.

*Example:* Take a look at the pink cell. The units that it belongs to, marked in blue, already contain the integers 1, 2, 3, 4, 5, 6, 8, and 9, so these cannot be the value of the pink cell. The only remaining integer is 7, and is thus the value of the pink cell.

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

### 2. Cell Elimination

Since each unit must contain each of the integers from 1 to 9, you can also use elimination to figure out where an integer goes in the unit. You look at a unit, and pick an integer it doesn't already contain. You then look at the surroundings for that integer and eliminate any cells in the unit that also belong to the same units as the integers you found. If there is only one empty cell left in the unit, that cell is the position of the integer.

*Example:* Look at the middle 3×3 box. It needs a 6. We find the 6s in the surrounding areas, marked in green, and eliminate the cells in the box that are in the same units as those 6s, which are marked in blue. The only empty cell left is the one in pink, and is thus the position of the 6 for that box.

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

These two methods are all you need to solve the puzzles found in this book (Level 1). Other puzzles might require more advanced techniques which we shall cover in a later book.

Have fun!

#1

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

#2

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

#3

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

#4

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

#5

	<b>6</b>	<b>7</b>			<b>5</b>			
					<b>4</b>	<b>1</b>		<b>3</b>
<b>4</b>		<b>2</b>	<b>1</b>		<b>9</b>	<b>8</b>		
						<b>6</b>		<b>9</b>
<b>2</b>				<b>8</b>				<b>4</b>
<b>3</b>		<b>4</b>						
		<b>1</b>	<b>2</b>		<b>6</b>	<b>3</b>		<b>8</b>
<b>5</b>		<b>9</b>	<b>3</b>					
			<b>9</b>			<b>4</b>	<b>5</b>	

#6

						<b>7</b>	<b>6</b>	
	<b>6</b>				<b>4</b>		<b>3</b>	
	<b>2</b>	<b>9</b>			<b>3</b>	<b>1</b>		
		<b>3</b>	<b>1</b>				<b>5</b>	
	<b>5</b>	<b>7</b>	<b>4</b>		<b>6</b>	<b>3</b>	<b>1</b>	
	<b>9</b>				<b>5</b>	<b>8</b>		
		<b>4</b>	<b>9</b>			<b>5</b>	<b>8</b>	
	<b>1</b>		<b>6</b>				<b>7</b>	
	<b>3</b>	<b>2</b>						

#7

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

#8

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

#9

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

#10

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



#11

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

#12

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

#13

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

#14

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

**#15**

<b>3</b>							<b>8</b>	<b>7</b>
					<b>5</b>	<b>4</b>		
	<b>7</b>			<b>4</b>	<b>3</b>		<b>2</b>	<b>1</b>
<b>1</b>			<b>6</b>				<b>7</b>	<b>5</b>
	<b>6</b>						<b>4</b>	
<b>5</b>	<b>4</b>				<b>7</b>			<b>2</b>
<b>6</b>	<b>3</b>		<b>5</b>	<b>1</b>			<b>9</b>	
		<b>9</b>	<b>3</b>					
<b>7</b>	<b>1</b>							<b>8</b>

**#16**

	<b>7</b>				<b>2</b>			
		<b>5</b>		<b>8</b>		<b>6</b>		
<b>9</b>	<b>3</b>	<b>8</b>		<b>4</b>				
					<b>5</b>		<b>8</b>	<b>4</b>
<b>4</b>		<b>9</b>		<b>6</b>		<b>5</b>		<b>7</b>
<b>5</b>	<b>8</b>		<b>7</b>					
				<b>7</b>		<b>8</b>	<b>3</b>	<b>5</b>
		<b>1</b>		<b>2</b>		<b>4</b>		
			<b>3</b>				<b>1</b>	

#17

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

#18

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

#19

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

#20

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

#21

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

#22

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

#23

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

#24

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

#25

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

#26

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



#27

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

#28

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

#29

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

#30

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

Solutions:

#1

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

#2

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

#3

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

#4

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

#5

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

#6

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

#7

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

#8

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

#9

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

#10

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

#11

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

#12

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

#13

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

#14

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

#15

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

#16

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

#17

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

#18

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

#19

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

#20

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

#21

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

#22

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

#23

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

#24

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

#25

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

#26

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

#27

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

#28

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

#29

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

#30

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

We hope you have enjoyed these Sudoku puzzles using the solving methods that we taught in this book. If you have any feedback regarding this book, please submit your comments at: [sudoku@onlinemathlearning.com](mailto:sudoku@onlinemathlearning.com)

If you have completed some of the puzzles in this book, you would be ready for the next level of difficulty. Our next book in this series: *Sudoku By Steps - Level 2* teaches more advanced steps to solving Sudoku puzzles; enabling you to handle harder puzzles. Please visit our webpage at: <http://www.onlinemathlearning.com/sudoku-steps> for details of the next book (the details will be posted when the next book is available).

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