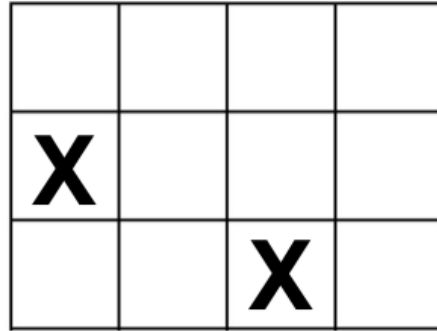
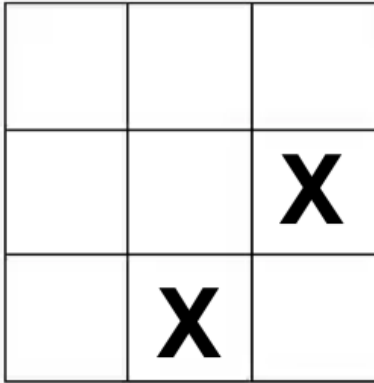


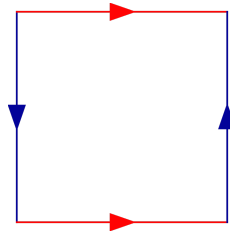
Some Puzzles For You To Try

Warm Up:

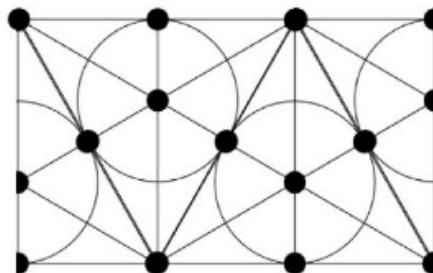
Try this toroidal tic-tac-toe, based on the square torus representation from the poster. Where would you need to place the last X to have three in a row?



Easy: Now, we'll do a Klein bottle sudoku. You can imagine the Klein bottle by taking a rectangle and gluing the right and left edges with a half twist. The top and bottom edges are glued without the twist. So, the polygonal representation of a Klein bottle, following our poster figures, looks something like this:

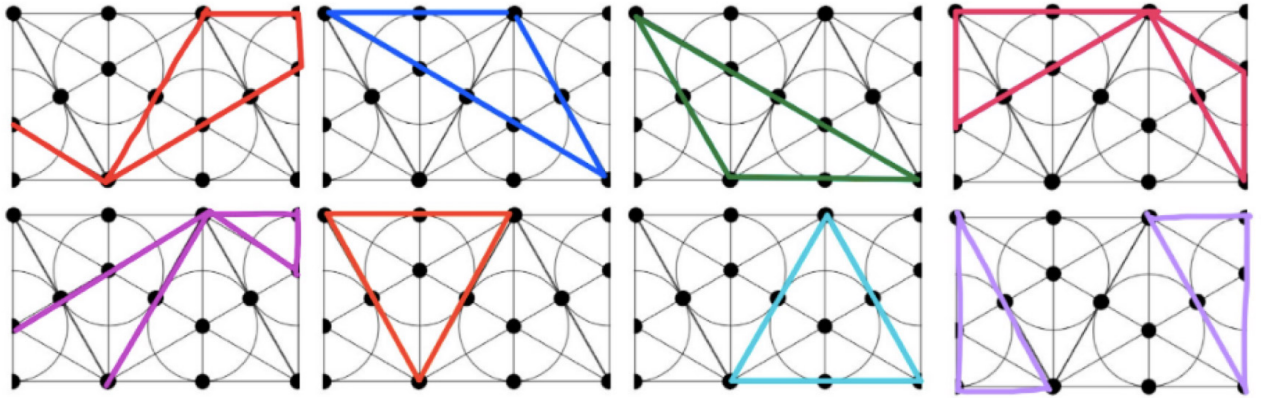


To make a game with these gluing conditions more interesting, our board will look different than the standard sudoku grid. This is what the blank grid will look like:

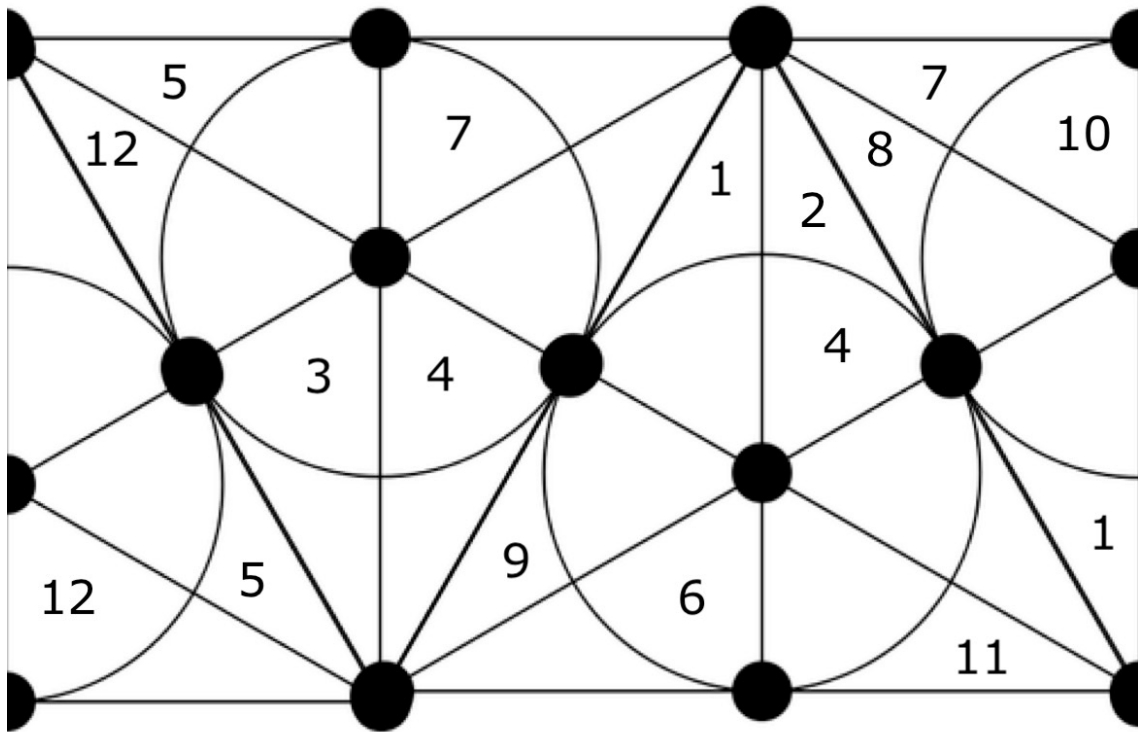


Instead of 3×3 blocks in regular sudoku, the containers for the numbers are 12-piece triangles. Each container needs to contain each of the numbers 1-12. Some of the containers are created through a half twist between the left and right edges (which is what makes this a Klein bottle puzzle!).

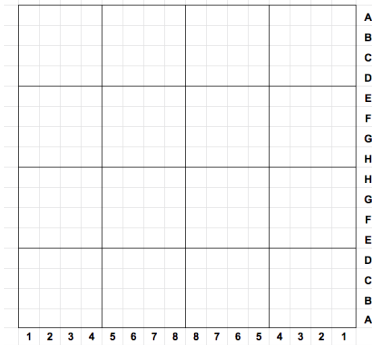
There are 8 containers. Here are the blocks:



We're now ready to try it!



Medium: For the last puzzle, here's sudoku on the projective plane. The rules are the same as on the poster. Remember that each row and column must have one instance of each of the numbers 1-16 and one instance of each of the letters A-G. Also, since we're on the projective plane, the top and bottom and right and left edges are glued with a half twist. So, you could think of the board as being labelled like this:



Good luck!

	5	8		C	B	G			6	9			H	I	
13	6	1		N			H				15	K	B		C
2			11		K	M			13	10			D	G	O
	12	16	9	O		F	I	4		11	3	J	A		M
A	C		H		1	9			E	M				3	
	N	K		14			6	F		A	L	1			12
L		F	B		12		11	O		N	P	16	4		14
G	P	M		13	4	3			B		J		15	11	10
6	1	9		H		A			7	14	12		E	F	N
3		13	7	M	E		J	2		6		A	G		H
15			4	I	G		B	13			10		C	O	
	2				F	N			4	16		P		B	I
B		N	D	6	13	10	5	C	K		G	15	2	14	
E	J	I			7	12			L	H		6			9
F		P	G	4			9	M			E		3	7	11
	M	L			15	11			D	J	F		10	13	

Hard: This puzzle has the same instructions as the one above.

	2		11	D		H		14		4		O		J	
					E		I		8		13	L		D	
6	13		12	B		N	A							P	
	5							3		12		K		F	
B		P			6	9		H		N		8			
		L	F					G			M			16	
M				3			12					2	14		
	A		J		13	1			C		K			12	4
7	14			I		B			3	15		M		G	
			13	4				7			10				I
5				J			C					N	D		
			15		G		M		11	14			K		J
	I		E		2		6								15
F								O	M		C	3		7	10
G			H	16		12		N		J					
	N		P		3		15		E		G	16		1	