

Group Theory Sudoku

Complete each of the following group multiplication tables (also called “Cayley Tables”).

Where needed, “id” is used to represent the identity element. Remember, the rules of a group’s multiplication table are (1) every element appears exactly once in each row and column, (2) if $xy = \text{id}$, then $yx = \text{id}$, (3) $x(yz) = (xy)z$. Here, rule (3) is not used. Try Section 4.3, problem 8 for a harder one.

·	id	a	b	c
id	id	a	b	c
a	a	id		
b	b		id	
c	c			id

·	id	a	b	c	d
id	id	a	b		
a	a				b
b		c		d	
c		id			
d			id		

·	id	2	3	4	5	6	7	8
id	id					6		
2		id	8					3
3				5	id		8	
4		7		id	3	8	2	
5			id			2	6	
6	6	3	2		7	id	5	
7		4					id	5
8			7					id

In the following Cayley table for a group of with 8 elements, it is helpful to first determine which element is behaving like the identity element.

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