

Disco I - answers to worksheet #3

1. Composing Ri - e Shu - es

1. Shu - e an eight card deck with a $\frac{1}{2}_{3;5;i}$ shu - e and follow this with $\frac{1}{2}_{5;3;i}$:
Write down the list notation and the cycle notation for both of these shu - es
and the composition or product $\frac{1}{2}_{3;5;i}\frac{1}{2}_{5;3;i}$:

	$\frac{1}{2}_{3;5;i}$	$\frac{1}{2}_{5;3;i}$	$\frac{1}{2}_{3;5;i}\frac{1}{2}_{5;3;i}$
list	4; 5; 6; 1; 7; 2; 8; 3	1; 2; 3; 6; 7; 4; 8; 5	4; 5; 2; 6; 8; 1; 3; 7
cycle	(1; 4)(2; 6; 3; 8; 7; 5)	(3; 4; 6)(5; 8; 7)	(1; 6; 4)(2; 3; 7; 8; 5)

2. Composing TIAR shu - es.

2. In groups, work out the list and cycle notation for the shu - es $\zeta_{4;8}$; $\zeta_{5;8}$;
 $\zeta_{4;8}\zeta_{5;8}$ and $\zeta_{5;8}\zeta_{4;8}$. Is permutation multiplication commutative?

	$\zeta_{4;8}$	$\zeta_{5;8}$	$\zeta_{4;8}\zeta_{5;8}$	$\zeta_{5;8}\zeta_{4;8}$
list	2; 3; 4; 1; 5; 6; 7; 8	2; 3; 4; 5; 1; 6; 7; 8	3; 4; 1; 5; 2; 6; 7; 8	3; 4; 5; 2; 1; 6; 7; 8
cycle	(1; 4; 3; 2)	(1; 5; 4; 3; 2)	(1; 3)(2; 5; 4)	(1; 5; 3)(2; 4)

Multiplication is not commutative.

4. Repeat let $\zeta = \zeta_{4;8}$: Repeat ζ three times, i.e., compute $\zeta^3 = \zeta\zeta\zeta$:

	ζ	ζ^2	ζ^3	ζ^3
list	2; 3; 4; 1; 5; 6; 7; 8	3; 4; 1; 2; 5; 6; 7; 8	4; 1; 2; 3; 5; 6; 7; 8	1; 2; 3; 4; 5; 6; 7; 8
cycle	(1; 4; 3; 2)	(1; 3)(4; 2)	(1; 2; 3; 4)	id