

## Multiplying elements of $S_n$ .

Ex. In  $S_{10}$ , sps

$$\alpha = (3, 4, 7)(1, 10, 6, 5)$$

$$\beta = (2, 4, 7)(8, 3)(9, 1, 10, 5)$$

Then, e.g.  $(\beta\alpha)(1) = \beta(\alpha(1)) = \beta(10) = 5.$

a new permutation  
obtained by composition

work right to left

want this in  
disjoint cycle notation.

In general,

$$\beta\alpha = \overbrace{(2, 4, 7)(8, 3)(9, 1, 10, 5)}^{\beta} \overbrace{(3, 4, 7)(1, 10, 6, 5)}^{\alpha}$$

$$= (1, 5, 10, 6, 9)(2, 4)(3, 7, 8)$$

disjoint cycle notation.