Quiz 3

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Question 1.(4 points.) Give the definition of a cycle.

Question 2.(6 points.) Let σ_1, σ_2 and σ_3 be the following permutations.

$$\sigma_1 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 3 & 5 & 4 & 8 & 7 & 6 & 2 & 1 \end{pmatrix}, \quad \sigma_2 = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 1 & 3 & 2 & 7 & 4 & 8 & 5 & 6 \end{pmatrix}, \quad \sigma_3 = (1\ 5\ 7)(3\ 4\ 2\ 6).$$

Compute $\sigma_1 \circ \sigma_2$.

Decompose σ_2 as a product of disjoint cycles.

Decompose σ_3 as a product of transpositions.

Problem 1.(6 points.) Complete the Cayley table of $(S_3, \circ)$.

$\circ$	1	(123)	(132)	(12)	(23)	(13)
1						
(123)						
(132)						
(12)						
(23)						
(13)						

Problem 2.(4 points.) What is the order of $(1\ 5\ 7)(3\ 4\ 2\ 6)$ in S_7?

What is the order of $(1\ 5\ 7\ 9)(3\ 4\ 2\ 6\ 8\ 10)$ in S_{10}?