# Applied Algebra

**Instructions**    Please write your name in the upper right-hand corner of the page. Use complete sentences, along with any necessary supporting calculations, to answer the following questions.

1. Suppose $\pi = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 5 & 4 & 3 & 2 & 1 \end{pmatrix}$ and $\sigma = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 4 & 1 & 3 & 5 \end{pmatrix}$. Determine the product $\pi\sigma$ of these two permutations in the symmetric group $S(5)$.

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2. Determine the order of the product $(1\ 2)(1\ 2\ 3)(1\ 2\ 3\ 4)$ of nondisjoint cycles in the symmetric group $S(4)$.