In problems 1 through 5, assume we are talking about permutations of the numbers, 1, 2, 3, and 4.

- 1. Write (1 4 2 3) as a product of transpositions. Is (1 4 2 3) an even permutation or an odd permutation?
- 2. Write $\begin{pmatrix} 1 & 4 & 2 & 3 \end{pmatrix}$ in the form $\begin{pmatrix} 1 & 2 & 3 & 4 \\ \downarrow & \downarrow & \downarrow & \downarrow \\ ? & ? & ? & ? \end{pmatrix}$.
- 3. Express the permutation $\begin{pmatrix} 1 & 4 & 2 & 3 \end{pmatrix}$ as a 4×4 permutation matrix times the column matrix $\begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}$.
- 4. Multiply $(1 \ 4 \ 2 \ 3)(2 \ 3 \ 1)$. Remember to multiply left to right. Also, classify the result as either an even permutation or an odd permutation.
- 5. Express $(1 \ 4 \ 2 \ 3)(2 \ 3 \ 1)$ as a product of permutation matrices, and verify that it

produces the correct permutation of the numbers $\begin{pmatrix} 1 \\ 2 \\ 3 \\ 4 \end{pmatrix}$.

6. Complete the multiplication table below for the products of the permutations of the numbers 1, 2, and 3. Remember to multiply left to right.

	(1)(2)(3)	(1	2)	(1	3)	(2	3)	(1	2	3)	(1	3	2)
(1)(2)(3)													
$\begin{pmatrix} 1 & 2 \end{pmatrix}$													
$\begin{pmatrix} 1 & 3 \end{pmatrix}$													
$\begin{pmatrix} 2 & 3 \end{pmatrix}$													
$\begin{pmatrix} 1 & 2 & 3 \end{pmatrix}$													
(1 3 2)													