Combinatorics. Quiz 5. Name $\qquad$ Time $\qquad$
Show all work for full or partial credit. Put a box around your final answer in each part. Try the problem on your own before helping each other understand it.

1. Find the number of permutations $\varphi$ of $[7]$ such that $\varphi(2) \neq 3, \varphi(2) \neq 5, \varphi(2) \neq 7$ $\varphi(3) \neq 4, \varphi(3) \neq 7$ and $\varphi(5) \neq 4, \varphi(5) \neq 7$.
2. Find the number of permutations $\varphi$ of $[7]$ such that $\varphi(2) \neq 3, \varphi(2) \neq 5, \varphi(2) \neq 7$ $\varphi(3) \neq 4, \varphi(3) \neq 1$.
3. (a) How many ways can four non-attacking rooks fit on a 4 by 4 board if none can be on the main length 4 diagonal? (Hint: what sort of permutation would this be?)
(b) How about if none can be on either length 4 diagonal?
