Correction to STAT 750 Homework Problem HW1.(B).(iii)

As you will have seen if you tried hard to solve it, Problem B.(iii) of HW1 is very tricky notationally. In fact, prompted by a student's question, I went back to see if the stated solution is perfectly correct. I believe now that it is not, and the last sentence of Problem B.(iii) should read as follows:

Index $1, \ldots, p^2$ by a double lexicographic index $(i, j) \leftrightarrow (j - 1)p + i$. That is, the matrix indices are vectorized by stacking the columns vertically. Use (ii) to conclude that the Jacobian of Y^{-1} viewed as a function of Y is the $p^2 \times p^2$ matrix with $(i, j), (k, l)$ entry equal to $-(Y^{-1})_{i,k} \cdot (Y^{-1})_{l,j}$, or equivalently

$$\frac{\partial(Y^{-1})_{i,j}}{\partial Y_{k,l}} = -(Y^{-1})_{i,k}(Y^{-1})_{l,j}$$

This Jacobian matrix is **not** exactly a Kronecker product, which contradicts my initial statement of the problem. The final conclusion about its determinant (in bold-face at the bottom of the problem) is still correct, although you are not asked to prove it.

Sorry for the error in the problem statement, and I hope it did not cost you much time.