UPDATED GENERAL INFORMATION — MAY 23, 2018

More for the third quiz

In the third problem, there might be some confusion about raising a matrix to the power $(k+p)/p$ if the latter is not an integer. Here is a clarification: Show that the index of nipotency is p/k if k evenly divides p (no integral remainder) and is $[p/k]+1$ if k does not evenly divide p; here $[x]$ denotes the largest integer m such that $m \leq x$.

Here is one more problem which is definitely worth considering for tomorrow's quiz.

5. Suppose that A and B are nilpotent $n \times n$ matrices such that $AB = BA$, and assume that $A^2 = B^2 = 0$. Prove that $A + B$ is nilpotent and in fact $(A+B)^3 = 0$. [*Hint:* Since A and B commute, one can use the Binomial Theorem to expand $(A+B)^k$ if k is a positive integer.]