

Math 308 P Conceptual Problems #6

Due Wednesday, February 27

Please write your name and your quiz section (PA, PB, or PC) on your homework paper.

(1) Find an *invertible* $n \times n$ matrix A and an $n \times n$ matrix B such that $\text{rank}(AB) \neq \text{rank}(BA)$, or explain why such matrices cannot exist.

(2) Find a 3×4 matrix A with nullity 2 and with

$$\text{col}(A) = \text{span} \left\{ \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 4 \\ -3 \\ 7 \end{bmatrix}, \begin{bmatrix} 3 \\ -2 \\ 5 \end{bmatrix} \right\},$$

or explain why such a matrix can't exist.

(3) Find a 3×3 matrix A and a 3×3 matrix B , each with nullity 1, such that AB is the 0 matrix, or explain why such matrices cannot exist.