HW 2 Due October 14th

1. Prove that $\text{rank}(A) = \text{rank}(B)$ does NOT imply $\text{rank}(A^2) = \text{rank}(B^2)$

2. Prove the following theorem:

   Consider $p$ vectors each having $n$ components. If $n<p$, then these vectors are linearly dependent.

3. Prove that $\text{rank } B^T A^T = \text{rank } AB$

4. Prove that $AB = 0$ does not generally imply $A = 0$ or $B = 0$ (or $BA = 0$)