PRINT Your Name:____________________________________

Quiz for June 14, 2005

Let A be an $m \times r$ matrix and B be an $r \times n$ matrix.

(a) Prove that the null space of B is contained in the null space of AB.

(b) Prove that the column space of AB is contained in the column space of A.

ANSWER:

(a) Let x be a vector in the null space of B. So, $Bx = 0$. Multiply by A to see $ABx = A0 = 0$. Conclude that x is in the null space of AB.

(b) Let y be a vector in the column space of AB. So, $y = ABx$ for some vector x. Thus, $y = A(Bx)$, and Bx is a column vector. It follows that y is in the column space of A.