PRINT Your Name:____________________________________

Quiz for September 4, 2009

True or False. (If True, prove it. If False, give a counterexample.) If A and B are 2×2 matrices with A not the zero matrix and $A^2 = AB$, then A must equal B.

ANSWER: FALSE. Let $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$. We see that A is not the zero matrix, $A^2 = AB = \begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$, but $A \neq B$.