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MATH221 05 problems

Name, ID

1. Explain why all these statements are false.
 - (a) The complete solution is any linear combination of x_p and x_n .
 - (b) A system $Ax = b$ has at most one particular solution.
 - (c) The solution x_p with all free variables zero is the shortest solution (minimum length $\|x\|$). Find a counterexample.
 - (d) If A is invertible there is no solution x_n in the nullspace.

2. True or False.
 - (a) Any matrix has at least one pivot variable.
 - (b) An invertible matrix has no free variables.
 - (c) A square matrix has no free variables.
 - (d) An m by n matrix has no more than n pivot variables.
 - (e) An m by n matrix no more than m pivot variables.