1. Suppose A is the coe±cient matrix for a system of n linear equations in n variables. Suppose one of the rows of A is a linear combination of its other rows.

(a) What can you say about the determinant of A? Support your answer with a clear and precise reasoning. (Hint: if you're stuck, making up examples might give you some ideas.)

(b) Show that by doing row operations on the system of equations, we can obtain an equivalent system in which all the coe±cients in one of the equations are zero.

(c) Suppose the coe±cient matrix A is 3 by 3. Use part (b) to prove that the original system of equations (i.e., before doing any row operations) is singular. (Note: you can't just say \the system is singular because A is non-invertible { it's true, but we haven't proved it yet!)

Extra Credit:

Same thing happens with columns: if one of the columns of the coe® mtx is a lin comb of the other columns, then the system is singular. Can you think of a good interpretation of this? If you can, please show it to me; I really want to see it!