MATH 54 FALL 2016: DISCUSSION 102/105 QUIZ#5

GSI: CHRISTOPHER EUR, DATE: 9/30/2016

STUDENT NAME: _____

Problem 1.   (a) (3 points) Compute the determinant of $A := \begin{bmatrix} 1 & 1 & 2 \\ -1 & 3 & -1 \\ 2 & -2 & 1 \end{bmatrix}$. Is A invertible?

   (b) (3 points) *Using Cramer's rule*, solve the system of linear equations:
$$\begin{cases} 2x - y & = -1 \\ -x + y & = 1 \end{cases}$$

Problem 2. Let A be an invertible square matrix.

   (a) (2 points) Show that $(\det A)(\det A^{-1}) = 1$.

   (b) (2 points) Use part (a) to show the following statement:

       *Suppose A is a matrix with all **integer entries** such that A^{-1} also has all integer entries.*
       Then $|\det(A)| = |\det(A^{-1})| = 1$.

       [Hint: If A has all integer entries, is $\det A$ also an integer?]