QUIZ 9

Math 3321

Name: **April 8, 2008**

Question 1. *(.5pt each) Mark each statement "True or False".*

F 1. *(TRUE/FALSE) The determinant of the square matrix A is the product of the diagonal entries in A.* only if triangular matrix

T 2. *(TRUE/FALSE) If two rows of an $n \times n$ matrix A are the same, then* $\det(A) = 0$.

F 3. *(TRUE/FALSE) If A and B are row equivalent, then $det(A) = det(B)$.*

Question 2. *(3.5pts) Compute the determinant*

$$\begin{vmatrix} 6 & 3 & 2 & 0 \\ 0 & -5 & 6 & 1 \\ 3 & 0 & 0 & 0 \\ 4 & -1 & 3 & 0 \end{vmatrix} = 3 \begin{vmatrix} 3 & 2 & 0 \\ -5 & 6 & 1 \\ -1 & 3 & 0 \end{vmatrix} =$$

$$= -3 \begin{vmatrix} 3 & 2 \\ -1 & 3 \end{vmatrix}$$

$$= -3\ (9 + 2)$$

$$= -3 \cdot 11$$

$$= -33$$

Question 3. *(5pts) Use the determinant to decide whether the matrix*

$$A = \begin{pmatrix} 1 & 0 & 2 \\ 2 & -1 & 3 \\ 4 & 1 & 8 \end{pmatrix}$$

has an inverse.

(ii) If the inverse exists, find it.

(i) $\begin{vmatrix} 1 & 0 & 2 \\ 2 & -1 & 3 \\ 4 & 1 & 8 \end{vmatrix} = 1 \begin{vmatrix} -1 & 3 \\ 1 & 8 \end{vmatrix} + 2 \begin{vmatrix} 2 & -1 \\ 4 & 1 \end{vmatrix}$

$= -8 - 3 + 2(2+4)$

$= -11 + 12 = 1 \Rightarrow$ invertible

(ii) $\left(\begin{array}{ccc|ccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 2 & -1 & 3 & 0 & 1 & 0 \\ 4 & 1 & 8 & 0 & 0 & 1 \end{array}\right) \sim \left(\begin{array}{ccc|ccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 0 & -1 & -1 & -2 & 1 & 0 \\ 0 & 1 & 0 & -4 & 0 & 1 \end{array}\right)$

$\sim \left(\begin{array}{ccc|ccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 0 & 1 & 1 & 2 & -1 & 0 \\ 0 & 1 & 0 & -4 & 0 & 1 \end{array}\right)$

$\sim \left(\begin{array}{ccc|ccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 0 & 1 & 1 & 2 & -1 & 0 \\ 0 & 0 & -1 & -6 & 1 & 1 \end{array}\right) \sim \left(\begin{array}{ccc|ccc} 1 & 0 & 2 & 1 & 0 & 0 \\ 0 & 1 & 1 & 2 & -1 & 0 \\ 0 & 0 & 1 & 6 & -1 & -1 \end{array}\right)$

$\sim \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & -11 & 2 & 2 \\ 0 & 1 & 0 & -4 & 0 & 1 \\ 0 & 0 & 1 & 6 & -1 & -1 \end{array}\right)$

$A^{-1} = \begin{pmatrix} -11 & 2 & 2 \\ -4 & 0 & 1 \\ 6 & -1 & -1 \end{pmatrix}$