

Math 2311 Quiz #6

FALL SEMESTER 2007

Name SOLUTIONS

1. Compute the determinant of

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

$$|A| = \begin{vmatrix} 2 & 0 & -1 & 4 & 3 \\ 2 & 1 & 1 & -2 & 1 \\ -1 & 0 & 1 & 0 & 2 \\ 3 & 0 & 2 & 3 & -1 \\ 1 & 0 & -2 & 2 & 3 \end{vmatrix} = 1 \begin{vmatrix} 2 & -1 & 4 & 3 \\ -1 & 1 & 0 & 2 \\ 3 & 2 & 3 & -1 \\ 1 & -2 & 2 & 3 \end{vmatrix}$$

$-2R_2+R_1$
 $-R_2+R_3$
 R_2+R_5

$$= \begin{vmatrix} 1 & 0 & 4 & 5 \\ -1 & 1 & 0 & 2 \\ 5 & 0 & 3 & -5 \\ -1 & 0 & 2 & 7 \end{vmatrix} = 1 \begin{vmatrix} 1 & 4 & 5 \\ 5 & 3 & -5 \\ -1 & 2 & 7 \end{vmatrix} \begin{matrix} -5R_1+R_2 \\ R_1+R_3 \end{matrix} = \begin{vmatrix} 1 & 4 & 5 \\ 0 & -17 & -30 \\ 0 & 6 & 12 \end{vmatrix}$$

R_2+R_1
 $-2R_2+R_3$
 $2R_2+R_4$

$$= (-17)(12) + 6(30)$$

$$= -204 + 180$$

$$= \underline{\underline{-24}}$$

2. Let A be a 4×4 matrix with $|A| = 5$. Compute:

(a) $|2A| = 2^4 \cdot 5 = 80$ $\Rightarrow |A^{-1}| = \frac{1}{5}$

(b) $|3A^{-1}| = 3^4 \cdot \frac{1}{5} = \frac{81}{5}$

(c) $|2A^3| = 2^4 |A|^3 = 16 \cdot 125 = 2000$