Name KEY

Math 268, Quiz #3, Spring 2012

Instructions: Show all work. The problems should be done by hand. You may check your answers by calculator, but answers only will not receive credit without work.

1. Find the determinant of the matrix $\begin{bmatrix} 6 & 3 & 2 & -1 & 0 \\ 5 & -3 & 4 & 7 & 0 \\ 0 & 1 & -1 & -2 & 4 \\ 8 & 2 & 3 & 1 & -2 \\ -3 & 0 & 9 & -1 & -6 \end{bmatrix}$ by the cofactor method.

-1060

See attached

2. If det(A)=4 and det(B)=3, find the values of the following expressions if A and B are both nxn.

a. det(AB) 12

b. $\det(A^{-1})$ 1/4

c. $\det(A^5)$ 1024

d. $\det(-A^2B^T)$ $(-1)^n \cdot 48$

e. det(3A) $3^n * 4$

f. $\det(B^{-1}AB)$ 4

g. $\det(A^T)$ 4

h. $\det[(AB)^{-1}]$ 1/12

det = −1060 by calc

$$4\begin{vmatrix} 6 & 3 & 2 & -1 \\ 5 & -3 & 4 & 7 \\ 8 & 2 & 3 & 1 \\ -3 & 0 & 9 & -1 \end{vmatrix} + 2\begin{vmatrix} 6 & 3 & 2 & -1 \\ 5 & -3 & 4 & 7 \\ 0 & 1 & -1 & -2 \\ -3 & 0 & 9 & -1 \end{vmatrix} - 6\begin{vmatrix} 6 & 3 & 2 & -1 \\ 5 & -3 & 4 & 7 \\ 0 & 1 & -1 & -2 \\ 8 & 2 & 3 & 1 \end{vmatrix}$$

-170 $\quad -190$ $\quad 0$

$4(-170) + 2(-190) - 6(0) = -1060$

$$= 4\left[(+3)\begin{vmatrix} 3 & 2 & -1 \\ -3 & 4 & 7 \\ 2 & 3 & 1 \end{vmatrix} - 9\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 8 & 2 & 1 \end{vmatrix} - 1\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 8 & 2 & 3 \end{vmatrix}\right]$$

$0 \qquad 17 \qquad 17$

$$+2\left[3\begin{vmatrix} 3 & 2 & -1 \\ -3 & 4 & 7 \\ 1 & -1 & -2 \end{vmatrix} - 9\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 0 & 1 & -2 \end{vmatrix} - 1\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 0 & 1 & -1 \end{vmatrix}\right]$$

$0 \qquad 19 \qquad 19$

$$-6\left[-1\begin{vmatrix} 6 & 2 & -1 \\ 5 & 4 & 7 \\ 8 & 3 & 1 \end{vmatrix} - 1\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 8 & 2 & 1 \end{vmatrix} + 2\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 8 & 2 & 3 \end{vmatrix}\right] =$$

$17 \qquad 17 \qquad 17$

$$12\begin{vmatrix} 3 & 2 & -1 \\ -3 & 4 & 7 \\ 2 & 3 & 1 \end{vmatrix} - 36\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 8 & 2 & 1 \end{vmatrix} - 4\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 8 & 2 & 3 \end{vmatrix}$$

$0 \qquad 17 \qquad 19$

$$+6\begin{vmatrix} 3 & 2 & -1 \\ -3 & 4 & 7 \\ 1 & -1 & -2 \end{vmatrix} - 18\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 0 & 1 & -2 \end{vmatrix} - 2\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 0 & 1 & -1 \end{vmatrix}$$

$0 \qquad 0$

$$+6\begin{vmatrix} 6 & 2 & -1 \\ 5 & 4 & 7 \\ 8 & 3 & 1 \end{vmatrix} + 6\begin{vmatrix} 6 & 3 & -1 \\ 5 & -3 & 7 \\ 8 & 2 & 1 \end{vmatrix} = 12\begin{vmatrix} 6 & 3 & 2 \\ 5 & -3 & 4 \\ 8 & 2 & 3 \end{vmatrix}$$

$17 \qquad 17 \qquad 17$

$$12\left[3\begin{vmatrix}4&7\\3&1\end{vmatrix}-2\begin{vmatrix}-3&7\\2&1\end{vmatrix}-1\begin{vmatrix}-3&4\\2&3\end{vmatrix}\right]$$

$$\begin{vmatrix}4&7\\3&1\end{vmatrix}=-17 \qquad \begin{vmatrix}-3&7\\2&1\end{vmatrix}=-17 \qquad \begin{vmatrix}-3&4\\2&3\end{vmatrix}=-17$$

$$-36\left[6\begin{vmatrix}-3&7\\2&1\end{vmatrix}-3\begin{vmatrix}5&7\\8&1\end{vmatrix}-1\begin{vmatrix}5&-3\\8&2\end{vmatrix}\right]$$

$$\begin{vmatrix}-3&7\\2&1\end{vmatrix}=-17 \qquad \begin{vmatrix}5&7\\8&1\end{vmatrix}=-51 \qquad \begin{vmatrix}5&-3\\8&2\end{vmatrix}=34$$

$$-4\left[6\begin{vmatrix}-3&4\\2&3\end{vmatrix}-3\begin{vmatrix}5&4\\8&3\end{vmatrix}+2\begin{vmatrix}5&-3\\8&2\end{vmatrix}\right]$$

$$\begin{vmatrix}-3&4\\2&3\end{vmatrix}=-17 \qquad \begin{vmatrix}5&4\\8&3\end{vmatrix}=-17 \qquad \begin{vmatrix}5&-3\\8&2\end{vmatrix}=34$$

$$+6\left[3\begin{vmatrix}4&7\\-1&-2\end{vmatrix}-2\begin{vmatrix}-3&7\\1&-2\end{vmatrix}-1\begin{vmatrix}-3&4\\1&-1\end{vmatrix}\right]$$

$$\begin{vmatrix}4&7\\-1&-2\end{vmatrix}=-1 \qquad \begin{vmatrix}-3&7\\1&-2\end{vmatrix}=-1 \qquad \begin{vmatrix}-3&4\\1&-1\end{vmatrix}=-1$$

$$-18\left[-1\begin{vmatrix}6&-1\\5&7\end{vmatrix}-2\begin{vmatrix}6&3\\5&-3\end{vmatrix}\right]$$

$$\begin{vmatrix}6&-1\\5&7\end{vmatrix}=47 \qquad \begin{vmatrix}6&3\\5&-3\end{vmatrix}=-33$$

$$-2\left[-1\begin{vmatrix}6&2\\5&4\end{vmatrix}-1\begin{vmatrix}6&3\\5&-3\end{vmatrix}\right]$$

$$\begin{vmatrix}6&2\\5&4\end{vmatrix}=14 \qquad \begin{vmatrix}6&3\\5&-3\end{vmatrix}=-33$$

$$+6\left[6\begin{vmatrix}4&7\\3&1\end{vmatrix}-2\begin{vmatrix}5&7\\8&1\end{vmatrix}-1\begin{vmatrix}5&4\\8&3\end{vmatrix}\right]$$

$$\begin{vmatrix}4&7\\3&1\end{vmatrix}=-17 \qquad \begin{vmatrix}5&7\\8&1\end{vmatrix}=-51 \qquad \begin{vmatrix}5&4\\8&3\end{vmatrix}=-17$$

$$+6\left[6\begin{vmatrix}-3&7\\2&1\end{vmatrix}-3\begin{vmatrix}5&7\\8&1\end{vmatrix}-1\begin{vmatrix}5&-3\\8&2\end{vmatrix}\right]$$

$$\begin{vmatrix}-3&7\\2&1\end{vmatrix}=-17 \qquad \begin{vmatrix}5&7\\8&1\end{vmatrix}=-51 \qquad \begin{vmatrix}5&-3\\8&2\end{vmatrix}=34$$

$$-12\left[6\begin{vmatrix}-3&4\\2&3\end{vmatrix}-3\begin{vmatrix}5&4\\8&3\end{vmatrix}+2\begin{vmatrix}5&-3\\8&2\end{vmatrix}\right]=$$

$$\begin{vmatrix}-3&4\\2&3\end{vmatrix}=-17 \qquad \begin{vmatrix}5&4\\8&3\end{vmatrix}=-17 \qquad \begin{vmatrix}5&-3\\8&2\end{vmatrix}=34$$

$$12(0)-36(17)-4(17)+6(0)-18(19)-2(19)+6(17)+6(17)$$

$-12(17) = -1060$

$$36\begin{vmatrix} 4 & 7 \\ 3 & 1 \end{vmatrix} - 24\begin{vmatrix} -3 & 7 \\ 2 & 1 \end{vmatrix} - 12\begin{vmatrix} -3 & 4 \\ 2 & 3 \end{vmatrix} - 216\begin{vmatrix} -3 & 7 \\ 2 & 1 \end{vmatrix}$$
$$-17 \qquad -17 \qquad -17 \qquad -17$$

$$+108\begin{vmatrix} 5 & 7 \\ 8 & 1 \end{vmatrix} + 36\begin{vmatrix} 5 & -3 \\ 8 & 2 \end{vmatrix} - 24\begin{vmatrix} -3 & 4 \\ 2 & 3 \end{vmatrix} + 12\begin{vmatrix} 5 & 4 \\ 8 & 3 \end{vmatrix}$$
$$-51 \qquad 34 \qquad -17 \qquad -17$$

$$-8\begin{vmatrix} 5 & -3 \\ 8 & 2 \end{vmatrix} + 18\begin{vmatrix} 4 & 7 \\ -1 & -2 \end{vmatrix} - 12\begin{vmatrix} -3 & 7 \\ 1 & -2 \end{vmatrix} - 6\begin{vmatrix} -3 & 4 \\ 1 & -1 \end{vmatrix}$$
$$34 \qquad -1 \qquad -1 \qquad -1$$

$$+18\begin{vmatrix} 6 & -1 \\ 5 & 7 \end{vmatrix} + 36\begin{vmatrix} 6 & 3 \\ 5 & -3 \end{vmatrix} + 2\begin{vmatrix} 6 & 2 \\ 5 & 4 \end{vmatrix} + 2\begin{vmatrix} 6 & 3 \\ 5 & -3 \end{vmatrix}$$
$$47 \qquad -33 \qquad 14 \qquad -33$$

$$+36\begin{vmatrix} 4 & 7 \\ 3 & 1 \end{vmatrix} - 12\begin{vmatrix} 5 & 7 \\ 8 & 1 \end{vmatrix} - 6\begin{vmatrix} 5 & 4 \\ 8 & 3 \end{vmatrix} + 36\begin{vmatrix} -3 & 7 \\ 2 & 1 \end{vmatrix} - 18\begin{vmatrix} 5 & 7 \\ 8 & 1 \end{vmatrix}$$
$$-17 \qquad -51 \qquad -17 \qquad -17 \qquad -51$$

$$-6\begin{vmatrix} 5 & -3 \\ 8 & 2 \end{vmatrix} - 72\begin{vmatrix} -3 & 4 \\ 2 & 3 \end{vmatrix} + 36\begin{vmatrix} 5 & 4 \\ 8 & 3 \end{vmatrix} - 24\begin{vmatrix} 5 & -3 \\ 8 & 2 \end{vmatrix} =$$
$$34 \qquad -17 \qquad -17 \qquad 34$$

-1060