

MATH 260, Homework 6, Fall '14
 Due: October 3, 2014 at 2:20 PM
 Honor Code:

Name:
 Section:

KEY

1) (10 pts) Do problem 19 from section 3.4 of the textbook on page 164.

$$\begin{vmatrix} 6 & 22 & 0 & -3 \\ 0 & -1 & 0 & 4 \\ 0 & 0 & 13 & 0 \\ 0 & 0 & 0 & 4 \end{vmatrix} = (6)(-1)(13)(4) = -312$$

Since this matrix is (upper) triangular, (meaning it's all 0's below the diagonal) its determinant is the product of the diagonal entries. -2 pts for not using this method (not following directions).

2) (15 pts) Do problem 26 from section 3.4 of the textbook on page 165.

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

expanding across row 2

$$\begin{aligned} &= 3(-4(-1)^{1+1} \begin{vmatrix} -3 & 5 \\ 6 & 9 \end{vmatrix} + 2(-1)^{1+2} \begin{vmatrix} 7 & 5 \\ -1 & 9 \end{vmatrix} + -2(-1)^{1+3} \begin{vmatrix} 7 & -3 \\ -1 & 6 \end{vmatrix}) \\ &+ 8(1(-1)^{1+1} \begin{vmatrix} 7 & 5 \\ -1 & 9 \end{vmatrix} + -4(-1)^{1+2} \begin{vmatrix} 4 & 5 \\ -5 & 9 \end{vmatrix} + -2(-1)^{1+3} \begin{vmatrix} 4 & 7 \\ -5 & -1 \end{vmatrix}) \\ &= 3(-4(-57) - 2(68) - 2(39)) + 8(1(68) + 4(61) - 2(31)) \\ &= \underline{2042} \neq 0, \text{ so the matrix is invertible (it's non-singular).} \end{aligned}$$

This part of answer worth 2 pts of the 15.