Math 20 – Spring 2002
Homework #9 Solutions (Selected)

2.4/#1, 3abcd, 4, 6, 10, 12, 18, 25

① (1pt) $A = \begin{pmatrix} 1 & -2 & 3 \\ 6 & 7 & -1 \\ -3 & 1 & 4 \end{pmatrix}$

(a) $M_{11} = 29 \qquad M_{12} = 21 \qquad M_{13} = 27$

$M_{21} = -11 \qquad M_{22} = 13 \qquad M_{23} = -5$

$M_{31} = -19 \qquad M_{32} = -19 \qquad M_{33} = 19$

(b) for cofactors, $C_{ij} = (-1)^{i+j} M_{ij}$.

③ (a) along first row.

(1pt)

$\det(A) = \det \begin{pmatrix} 1 & -2 & 3 \\ 6 & 7 & -1 \\ -3 & 1 & 4 \end{pmatrix} = 1 \cdot \begin{vmatrix} 7 & -1 \\ 1 & 4 \end{vmatrix} + 2 \begin{vmatrix} 6 & -1 \\ -3 & 4 \end{vmatrix} + 3 \begin{vmatrix} 6 & 7 \\ -3 & 1 \end{vmatrix}$

$= 29 + 2(21) + 3(27)$

$= 152.$

(d) along the second column.

$\det(A) = \det \begin{pmatrix} 1 & -2 & 3 \\ 6 & 7 & -1 \\ -3 & 1 & 4 \end{pmatrix} = -(-2)\begin{vmatrix} 6 & -1 \\ -3 & 4 \end{vmatrix} + 7 \begin{vmatrix} 1 & 3 \\ -3 & 4 \end{vmatrix} - 1 \cdot \begin{vmatrix} 1 & 3 \\ 6 & -1 \end{vmatrix}$

$= 2(21) + 7(13) - 1(-19)$

$= 152.$

④ (a) (1pt) $\text{adj}(A) = \begin{pmatrix} 29 & +11 & -19 \\ -21 & 13 & +19 \\ 27 & +5 & 19 \end{pmatrix}$

(b) $A^{-1} = \dfrac{1}{\det(A)} \text{adj}(A)$

$= \dfrac{1}{152} \begin{pmatrix} 29 & 11 & -19 \\ -21 & 13 & 19 \\ 27 & 5 & 19 \end{pmatrix}$

⑥ (1pt) $\det \begin{pmatrix} 3 & 3 & 1 \\ 1 & 0 & -4 \\ 1 & -3 & 5 \end{pmatrix} = -(3)\begin{vmatrix} 1 & -4 \\ 1 & 5 \end{vmatrix} - (-3)\begin{vmatrix} 3 & 1 \\ 1 & -4 \end{vmatrix}$

$= -3(9) + 3(-13)$

$= -66$