Key

Quiz 11

1. (5 points) Compute $\begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix}$ $\begin{matrix} 5 & 1 \\ 3 & -2 \\ -2 & 7 \end{matrix}$

$= (-10 - 2 - 126) - (-24 + 35 + 3)$

$= -138 - 14 = -152$

OR $= 5\begin{vmatrix} -2 & 1 \\ 7 & 1 \end{vmatrix} - \begin{vmatrix} 3 & 1 \\ -2 & 1 \end{vmatrix} - 6\begin{vmatrix} 3 & -2 \\ -2 & 7 \end{vmatrix}$

$= 5(-2-7) - (3+2) - 6(21-4)$

$= -45 - 5 - 102 = -152$

2. (5 points) Let $A = \begin{bmatrix} 2 & -3 & 7 & 8 \\ 0 & 1 & 2 & -9 \\ 0 & 0 & -4 & 2 \\ 0 & 0 & 0 & 5 \end{bmatrix}$

$\begin{matrix} + & - & + & - \\ - & + & - & + \\ + & - & + & - \\ - & + & - & + \end{matrix}$

a. Find det(A) by cofactor expansion.

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

$= 5(-4)(2-0) = 5(-4)(2)$

$= -40$

b. By just looking at the original matrix, could you compute the determinant without finding the determinants of any submatrices? If so, what would you look at?

yes, $\det A = \underbrace{(2)(1)(-4)(5)}_{\text{the diagonal elements}} = -40$