4/6/17

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5pts

5 pts. Compute the following determinant using a cofactor expansion **across the first row**. Also, compute the determinant by a cofactor expansion **down the second column.**

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

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

$$= 2(1)(0-3) + (3)(-1)(20-18) + (-3)(1)(4-0)$$

$$= 2(-3) + (-3)(2) + (-3)(4)$$

$$= -6 + -6 - 12$$

$$\boxed{= -24}$$

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

$$= (3)(-1)(20-18) + 0 + (-1)(6+12)$$

$$= (-3)(2) + 0 + (-1)(18)$$

$$= -6 - 18$$

$$\boxed{= -24}$$