Quiz 12

Suppose that you know that $\begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix} = -152$

Use this information to compute the following determinants:

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

$$= \left| \begin{bmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{bmatrix}^T \right| = \begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix} = -152$$

2. (2 points) $\begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ 6 & -21 & -3 \end{vmatrix}$

$$= -3 \cdot \begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix} = -3 \cdot -152 = 456$$

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

$$= (-1)^3 \cdot \begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix} = -1 \cdot -152 = 152$$

4. (4 points) $\begin{vmatrix} 3 & -2 & 1 \\ 5 & 1 & -6 \\ 3 & 8 & -5 \end{vmatrix}$

$$= -1 \cdot \begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ 3 & 8 & 5 \end{vmatrix}_{R_3 = R_3 - R_1}$$

$$= -\begin{vmatrix} 5 & 1 & -6 \\ 3 & -2 & 1 \\ -2 & 7 & 1 \end{vmatrix} = -1 \cdot -152 = 152$$