

a)

$$\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = \begin{vmatrix} 5 & 6 \\ 7 & 8 \end{vmatrix} - 2 \begin{vmatrix} 4 & 6 \\ 7 & 9 \end{vmatrix} + 3 \begin{vmatrix} 4 & 5 \\ 7 & 8 \end{vmatrix} = -2 + 12 - 9 = \boxed{1}$$

b)

$$\begin{vmatrix} 2 & 1 & -5 \\ 0 & 0 & 4 \\ 3 & 1 & 2 \end{vmatrix} = 2 \begin{vmatrix} 0 & 4 \\ 3 & 2 \end{vmatrix} - \begin{vmatrix} 0 & 4 \\ 3 & 2 \end{vmatrix} - 5 \begin{vmatrix} 0 & 0 \\ 3 & 1 \end{vmatrix} = -8 + 12 = \boxed{4}$$

2)

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

$$= -2 \left(-6 \begin{vmatrix} 1 & 0 \\ 1 & 2 \end{vmatrix} \right) - 4 \left(6 \begin{vmatrix} 1 & 0 \\ 1 & 5 \end{vmatrix} \right)$$

$$= 12 \begin{vmatrix} 1 & 0 \\ 1 & 2 \end{vmatrix} - 24 \begin{vmatrix} 1 & 0 \\ 1 & 5 \end{vmatrix}$$

$$= 24 - 120 = \boxed{-96}$$