

1. Let $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$ and suppose $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 5$.

Find each of the following and write your final answer in the box provided.

1a. $\begin{vmatrix} d & e & f \\ g & h & i \\ a & b & c \end{vmatrix}$

1b. $\begin{vmatrix} a & b & c \\ d+2a & e+2b & f+2c \\ g+4d+7a & h+4e+7b & i+4f+7c \end{vmatrix}$

1c. $\begin{vmatrix} a & b & c \\ 3d & 3e & 3f \\ g/4 & h/4 & i/4 \end{vmatrix}$

1d. $\det(3A)$

1e. $\begin{vmatrix} a & d & g \\ b & e & h \\ c & f & i \end{vmatrix}$

1f. $\begin{vmatrix} g & d & a \\ h & e & b \\ i & f & c \end{vmatrix}$

1g. $\begin{vmatrix} d & e & f \\ a+g & b+h & c+i \\ d & e & f \end{vmatrix}$

1h. $\det(A^{-1})$

2. By hand, find the determinant of the following matrix, using “cofactors” and taking advantage of zeros wherever possible. *Show all your steps.*

$$\begin{bmatrix} 4 & -9 & 8 & 1 \\ 0 & 0 & 5 & 0 \\ 6 & 3 & 10 & 2 \\ 7 & 0 & 2 & 3 \end{bmatrix}$$

3. *Bonus!* Justify your answer to (1f) above.