

Suppose that a  $4 \times 4$  matrix  $A$  with rows  $\vec{v}_1$ ,  $\vec{v}_2$ ,  $\vec{v}_3$ , and  $\vec{v}_4$  has determinant  $\det A = 9$ . Find the following determinants.

$$\det \begin{bmatrix} \vec{v}_1 \\ \vec{v}_2 \\ \vec{v}_3 \\ 7\vec{v}_4 \end{bmatrix} = \boxed{\phantom{000}}$$

$$\det \begin{bmatrix} \vec{v}_2 \\ \vec{v}_1 \\ \vec{v}_4 \\ \vec{v}_3 \end{bmatrix} = \boxed{\phantom{000}}$$

$$\det \begin{bmatrix} \vec{v}_1 + 4\vec{v}_3 \\ \vec{v}_2 \\ \vec{v}_3 \\ \vec{v}_4 \end{bmatrix} = \boxed{\phantom{000}}$$

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$$\det \begin{bmatrix} \vec{v}_1 \\ \vec{v}_2 \\ \vec{v}_3 \\ 7\vec{v}_4 \end{bmatrix} = \boxed{63}$$

$$\det \begin{bmatrix} \vec{v}_2 \\ \vec{v}_1 \\ \vec{v}_4 \\ \vec{v}_3 \end{bmatrix} = \boxed{9}$$

$$\det \begin{bmatrix} \vec{v}_1 + 4\vec{v}_3 \\ \vec{v}_2 \\ \vec{v}_3 \\ \vec{v}_4 \end{bmatrix} = \boxed{9}$$