

$$\vec{k} \wedge \vec{j} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 0 & 1 \\ 0 & 1 & 0 \end{vmatrix} = -1\vec{i} - 0\vec{j} + 0\vec{k} \\ = -\vec{i}$$

$$\vec{k} \wedge \vec{j} = -\vec{i}$$

$$\vec{k} \wedge \vec{i} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 0 & 1 \\ 1 & 0 & 0 \end{vmatrix} = 0\vec{i} + 0\vec{j} + 0\vec{k} \\ = \vec{j}$$

$$\vec{k} \wedge \vec{i} = \vec{j}$$

$$\vec{i} \wedge \vec{i} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 0 & 0 \\ 1 & 0 & 0 \end{vmatrix} = 0\vec{i} - 0\vec{j} + 0\vec{k} \\ = \vec{0}$$

$$\vec{i} \wedge \vec{i} = \vec{0}$$

$$\vec{j} \wedge 4\vec{k} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ 0 & 1 & 0 \\ 0 & 0 & 4 \end{vmatrix} = 4\vec{i} - 0\vec{j} + 0\vec{k} \\ = 4\vec{i}$$

$$\vec{j} \wedge 4\vec{k} = 4\vec{i}$$