$$\mathbf{a} \times \mathbf{b} = \det \begin{bmatrix} \hat{\boldsymbol{\imath}} & \hat{\boldsymbol{\jmath}} & \hat{\mathbf{k}} \\ 3 & 2 & 1 \\ 6 & 4 & 2 \end{bmatrix} = \hat{\boldsymbol{\imath}} \det \begin{bmatrix} \cancel{\hat{\boldsymbol{\imath}}} & \cancel{\hat{\boldsymbol{\jmath}}} & \cancel{\hat{\mathbf{k}}} \\ \cancel{3} & 2 & 1 \\ \cancel{6} & 4 & 2 \end{bmatrix} - \hat{\boldsymbol{\jmath}} \det \begin{bmatrix} \cancel{\hat{\boldsymbol{\imath}}} & \cancel{\hat{\boldsymbol{\jmath}}} & \cancel{\hat{\mathbf{k}}} \\ 3 & \cancel{2} & 1 \\ 6 & \cancel{4} & 2 \end{bmatrix} + \hat{\mathbf{k}} \det \begin{bmatrix} \cancel{\hat{\boldsymbol{\imath}}} & \cancel{\hat{\boldsymbol{\jmath}}} & \cancel{\hat{\mathbf{k}}} \\ 3 & 2 & \cancel{1} \\ 6 & 4 & \cancel{2} \end{bmatrix}$$

$$= \hat{\boldsymbol{\imath}}\,(2 \times 2 - 1 \times 4) - \hat{\boldsymbol{\jmath}}\,(3 \times 2 - 1 \times 6) + \hat{\mathbf{k}}\,(3 \times 4 - 2 \times 6) \;=\; \mathbf{0}$$