

$$\begin{pmatrix} a_x \\ a_y \\ a_z \end{pmatrix} \times \begin{pmatrix} b_x \\ b_y \\ b_z \end{pmatrix} = \det \begin{pmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ a_x & a_y & a_z \\ b_x & b_y & b_z \end{pmatrix} = (a_y b_z - a_z b_y) \mathbf{i} + (a_z b_x - a_x b_z) \mathbf{j} + (a_x b_y - a_y b_x) \mathbf{k}$$

Evaluation of the determinant via:

$$\begin{array}{ccccccc} + & + & + & & - & & - \\ & \mathbf{i} & \mathbf{j} & \mathbf{k} & \mathbf{i} & \mathbf{j} & \\ & a_x & a_y & a_z & a_x & a_y & \\ & b_x & b_y & b_z & b_x & b_y & \end{array}$$