$$\vec{v_1} \times \vec{v_2} = \begin{pmatrix} x_1 \\ y_1 \\ z_1 \end{pmatrix} \times \begin{pmatrix} x_2 \\ y_2 \\ z_2 \end{pmatrix} = \begin{pmatrix} y_1 z_2 \\ z_1 x_2 \\ x_1 y_2 \end{pmatrix} - \begin{pmatrix} z_1 y_2 \\ x_1 z_2 \\ y_1 x_2 \end{pmatrix}$$