Udledning af determinant

$$\vec{a} = \begin{pmatrix} a_x \\ a_y \end{pmatrix} \quad \vec{b} = \begin{pmatrix} b_x \\ b_y \end{pmatrix}$$

$$\vec{a} = \begin{pmatrix} -a_y \\ a_x \end{pmatrix} \quad \vec{b} = \begin{pmatrix} -b_y \\ b_x \end{pmatrix}$$

$$\vec{a} \cdot \vec{b} = \begin{pmatrix} a_x \\ a_y \end{pmatrix} \cdot \begin{pmatrix} -b_y \\ b_x \end{pmatrix} = a_y(-b_y) + a_y \cdot b_x$$

$$\vec{a} \cdot \vec{b} = \begin{vmatrix} a_x \\ a_y \end{vmatrix} \cdot b_x - a_x \cdot b_y$$

$$det(\vec{b}, \vec{a}) = \begin{vmatrix} b_x \\ a_y \end{vmatrix} = \begin{vmatrix} b_x \\ a_y \end{vmatrix} = \begin{vmatrix} b_x \\ a_y \end{vmatrix} - a_x \cdot b_y$$

$$\vec{a} \cdot \vec{b} = det(\vec{b}, \vec{a})$$

$$0 = \det(5, \vec{a}) = -\det(\vec{a}, \vec{b})$$

$$bx \cdot ay - ax \cdot by = 0$$
  
 $a_x \cdot b_y - a_y \cdot b_x = 0$