

내적

The image shows a handwritten derivation of the area of a triangle in 2D space using vector algebra. At the top, the formula for the area S is given as $S = \frac{1}{2} \sqrt{|\vec{a}|^2 \cdot |\vec{b}|^2 - (\vec{a} \cdot \vec{b})^2}$. This is then expanded into a coordinate-based formula: $S = \frac{1}{2} (|x_1 y_2 + x_2 y_3 + x_3 y_1 - x_2 y_1 - x_3 y_2 - x_1 y_3|)$. Below the formula, a diagram of a triangle is drawn with vertices $A(x_1, y_1)$, $B(x_2, y_2)$, and $C(x_3, y_3)$. The vertices are connected by lines to form the triangle. At the bottom, the vectors \vec{a} and \vec{b} are defined as $\vec{a} = (x_2 - x_1, y_2 - y_1)$ and $\vec{b} = (x_3 - x_1, y_3 - y_1)$.

$$S = \frac{1}{2} \sqrt{|\vec{a}|^2 \cdot |\vec{b}|^2 - (\vec{a} \cdot \vec{b})^2}$$
$$= \frac{1}{2} (|x_1 y_2 + x_2 y_3 + x_3 y_1 - x_2 y_1 - x_3 y_2 - x_1 y_3|)$$

$A(x_1, y_1)$ $B(x_2, y_2)$ $C(x_3, y_3)$

$$\vec{a} = (x_2 - x_1, y_2 - y_1)$$
$$\vec{b} = (x_3 - x_1, y_3 - y_1)$$

외적

$$\frac{1}{2} (\vec{a} \times \vec{b})$$