MCV4U

Properties and Applications of the Cross Product

Properties of the Cross Product

Let $\vec{a}, \vec{b}$ and $\vec{c}$ be vectors in three-dimensional space and let $k \in R$.

$\vec{a} \times \vec{b} =$

$\vec{a} \times (\vec{b} + \vec{c}) =$

$k(\vec{a} \times \vec{b}) =$

$\vec{a} \times \vec{a} =$

Two vectors $\vec{a}$ *and* $\vec{b}$ are collinear if and only if $\vec{a} \times \vec{b} = \vec{0}$

Triple Scalar Product

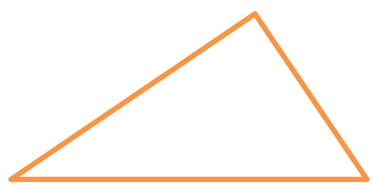
The triple scalar product between vectors $\vec{a}, \vec{b}$ and $\vec{c}$ is defined as $(\vec{a} \times \vec{b}) \cdot \vec{c}$

If $(\vec{a} \times \vec{b}) \cdot \vec{c} = 0$ what can you conclude?

If $(\vec{a} \times \vec{b}) \cdot \vec{c} \neq 0$ what can you conclude?

Area of a Parallelogram

Area of a Triangle

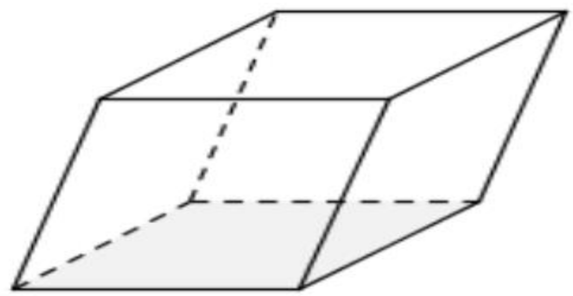


Example Find the area of the triangle having vertices A(1,2,3), B(-3,2,1) and C(2,3,-1)

Volume of a Parallelepiped

Volume = Area of base x height

=



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