Orthogonal Projection

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What is a projection?

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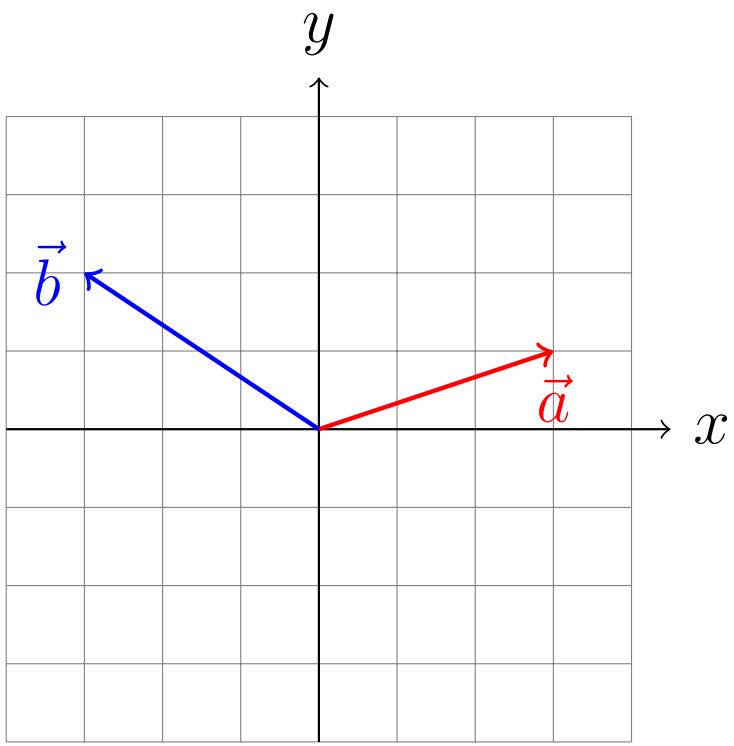
Note

In this presentation, projection refers to specifically orthogonal projection, $\vec{p}$ refers to $\text{proj}_S \vec{b}$, and $\vec{e}$ refers to the error vector $\vec{e} = \vec{b} - \vec{p}$.

What is a projection?

$\text{proj}_S \vec{b}$, the projection of vector $\vec{b}$ onto subspace S, is the vector inside of S closest to $\vec{b}$.
Closest means that the error is orthogonal to S.

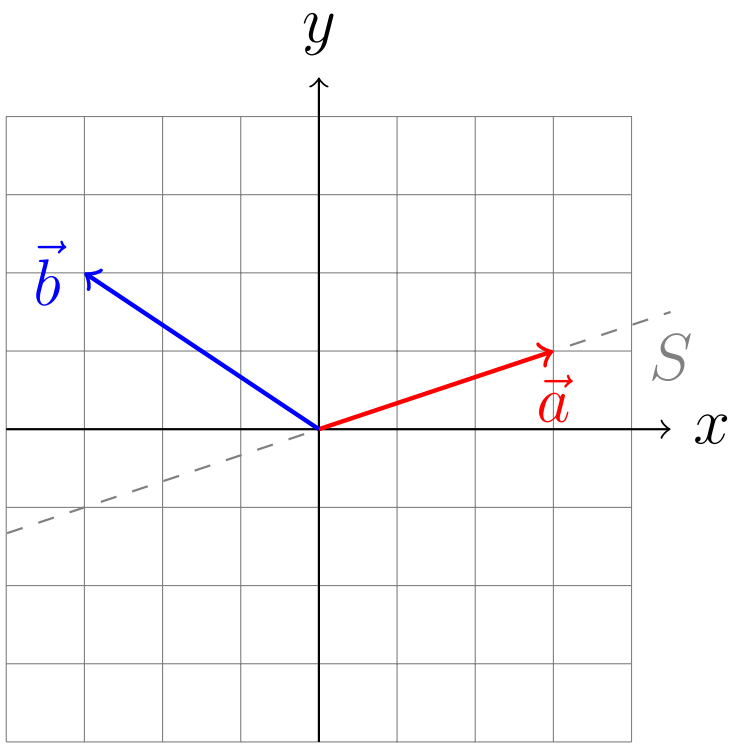
Example



Example

Draw $\text{proj}_a\, b$.

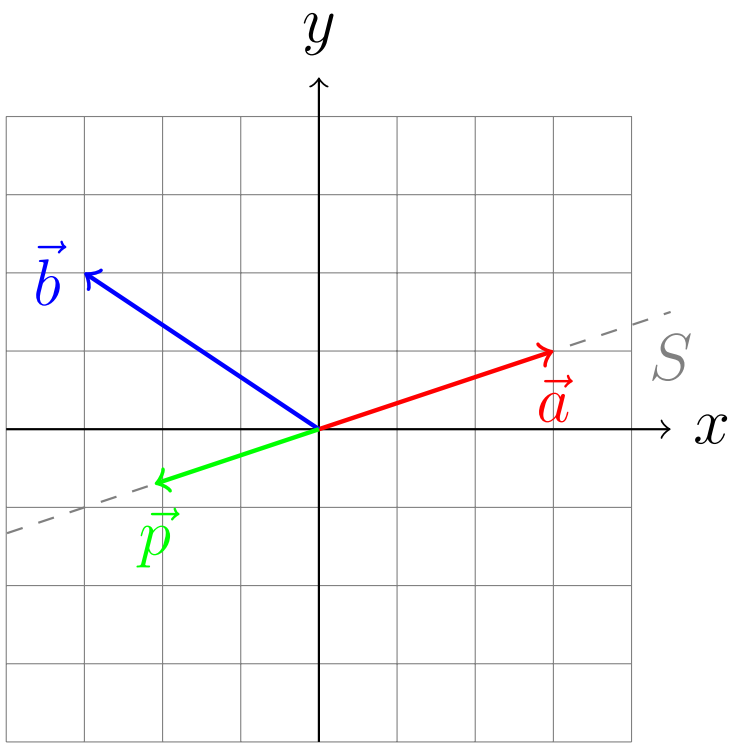
Example



Note

When projecting a vector onto another vector $\vec{a}$, the subspace S is the span of $\vec{a}$.

Example



Example