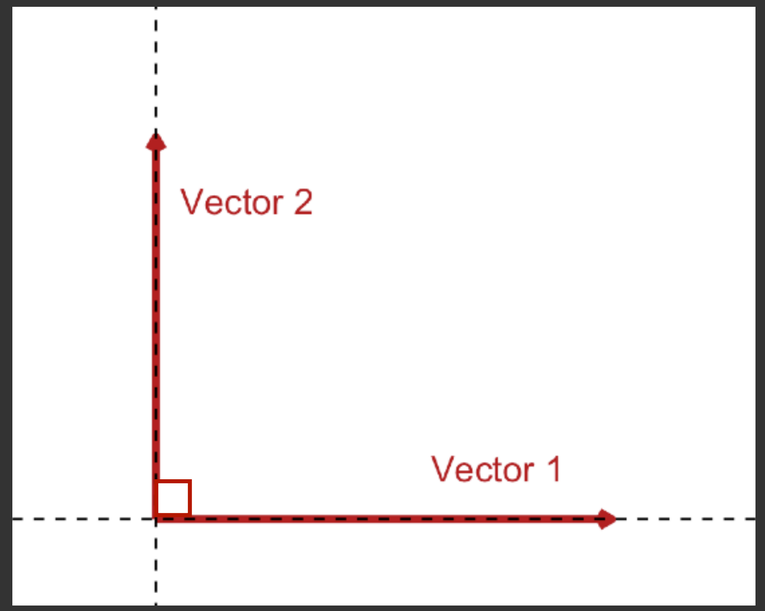
orthogonality

- $\cos 0^\circ = 1$ the vectors point in exactly the same direction (they coincide)
- $\cos 90^\circ = 0$ means the vectors are perpendicular (aka orthogonal) to each other in 2D or 3D

Two vectors are orthogonal to one another if the dot product of those two vectors is equal to zero

- Orthogonal vectors point in completely independent directions, meaning one vector cannot be expressed as a scalar multiple of the other



orthogonality

Two vectors are orthogonal to one another if the dot product of those two vectors is equal to zero

example

Let $\vec{a} = (1,2)$ and $\vec{b} = (-2,1)$

The dot product is

$$\vec{a} \cdot \vec{b} = (1)(-2) + (2)(1) = -2 + 2 = 0$$

Since their dot product is zero, $\vec{a}$ and $\vec{b}$ are orthogonal.