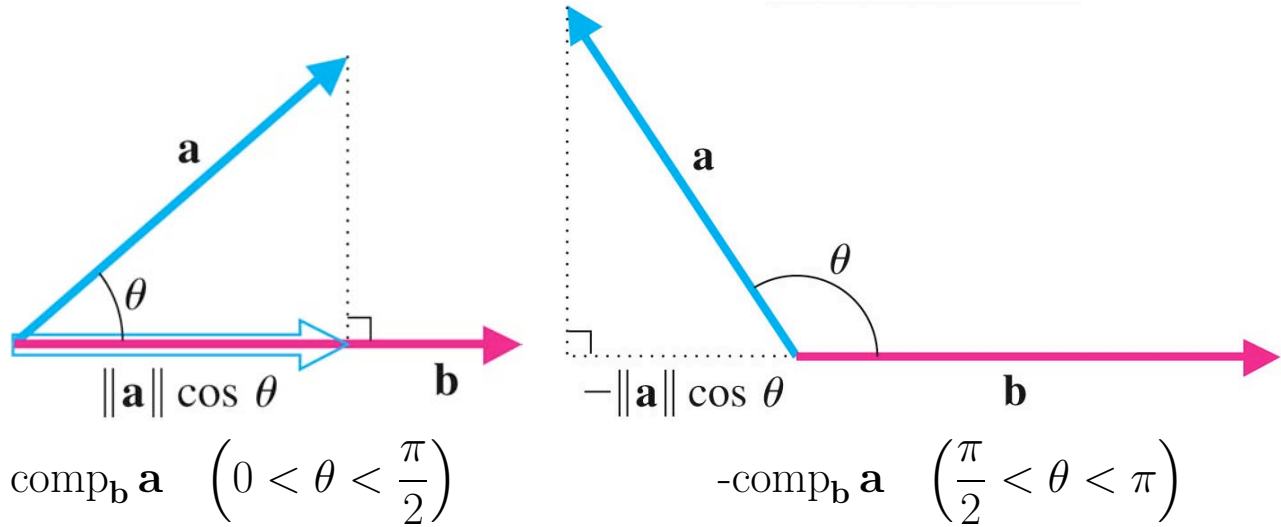


Component of \mathbf{a} along \mathbf{b}



NOTE. $\cos(\pi - \theta) = -\cos \theta$

$$\text{comp}_{\mathbf{b}} \mathbf{a} = \|\mathbf{a}\| \cos \theta = \frac{\|\mathbf{a}\| \|\mathbf{b}\|}{\|\mathbf{b}\|} \cos \theta = \frac{1}{\|\mathbf{b}\|} \|\mathbf{a}\| \|\mathbf{b}\| \cos \theta = \frac{1}{\|\mathbf{b}\|} \mathbf{a} \cdot \mathbf{b} \implies$$

$$\boxed{\text{comp}_{\mathbf{b}} \mathbf{a} = \frac{\mathbf{a} \cdot \mathbf{b}}{\|\mathbf{b}\|}}$$

is a number, a directed length, that depends on the length of \mathbf{a} since $\frac{\mathbf{b}}{\|\mathbf{b}\|}$ is a unit vector.