

Basics:	$\mathbf{a} = \langle a_1, a_2, a_3 \rangle$	$\mathbf{b} = \langle b_1, b_2, b_3 \rangle$	$ \mathbf{a} = \sqrt{a_1^2 + a_2^2 + a_3^2}$
Dot products:	$\text{proj}_{\mathbf{b}} \mathbf{a} = \left(\frac{\mathbf{a} \cdot \mathbf{b}}{ \mathbf{b} ^2} \right) \mathbf{b}$	$\text{scal}_{\mathbf{b}} \mathbf{a} = \frac{\mathbf{a} \cdot \mathbf{b}}{ \mathbf{b} }$	$\mathbf{a} \cdot \mathbf{b} = a_1 b_1 + a_2 b_2 + a_3 b_3 = \mathbf{a} \mathbf{b} \cos \theta$
Cross products:	$ \mathbf{a} \times \mathbf{b} = \mathbf{a} \mathbf{b} \sin \theta$	$\mathbf{a} \times \mathbf{b} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix}$	$\mathbf{a} \times \mathbf{b} = \langle a_2 b_3 - a_3 b_2, a_3 b_1 - a_1 b_3, a_1 b_2 - a_2 b_1 \rangle$
Applications:	$W = \mathbf{F} \cdot \mathbf{d}$	$\boldsymbol{\tau} = \mathbf{r} \times \mathbf{F}$	Arc Length: $L = \int_a^b \mathbf{r}'(t) dt$
Unit tangent vector:	$\mathbf{T}(t) = \frac{\mathbf{r}'(t)}{ \mathbf{r}'(t) }$	Curvature:	$\kappa = \frac{ \mathbf{r}'(t) \times \mathbf{r}''(t) }{ \mathbf{r}'(t) ^3}$