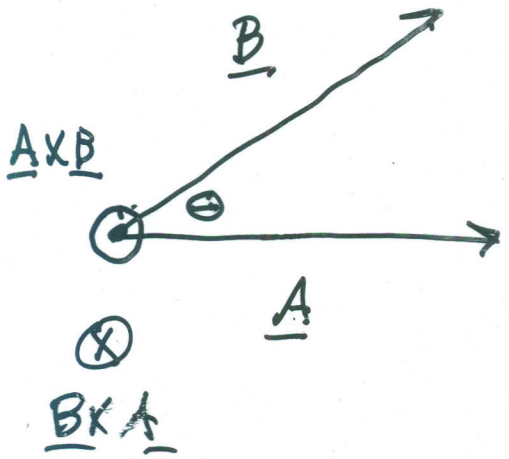
VECTOR OR CROSS PRODUCT

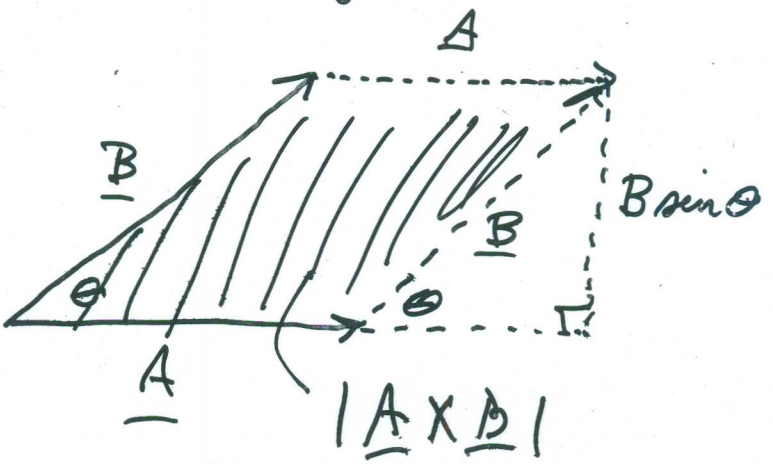
$\underline{A} \times \underline{B} \equiv AB \sin\theta$ in a dir given by a RHR

θ is the angle between $\underline{A}$ and $\underline{B}$



$|\underline{A} \times \underline{B}|$ is the "area" of the parallelogram with sides $\underline{A}$ and $\underline{B}$

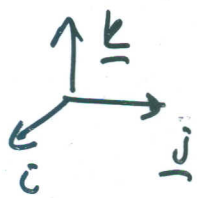
area = base · height = $AB \sin\theta$



anticommutative $\underline{A} \times \underline{B} = -\underline{B} \times \underline{A}$

distributive $\underline{A} \times (\underline{B} + \underline{C}) = \underline{A} \times \underline{B} + \underline{A} \times \underline{C}$

unit vectors



$\underline{i} \times \underline{i} = \underline{j} \times \underline{j} = \underline{k} \times \underline{k} = 0$ $\sin 0° = 0$

$\underline{i} \times \underline{j} = \underline{k}$ $\underline{j} \times \underline{k} = \underline{i}$ $\underline{k} \times \underline{i} = \underline{j}$ $\sin 90° = 1$

general 2D case

$$\underline{A} \times \underline{B} = (A_x \underline{i} + A_y \underline{j}) \times (B_x \underline{i} + B_y \underline{j})$$

$$= (A_x B_y - A_y B_x)\, \underline{k}$$