Week 3 Review

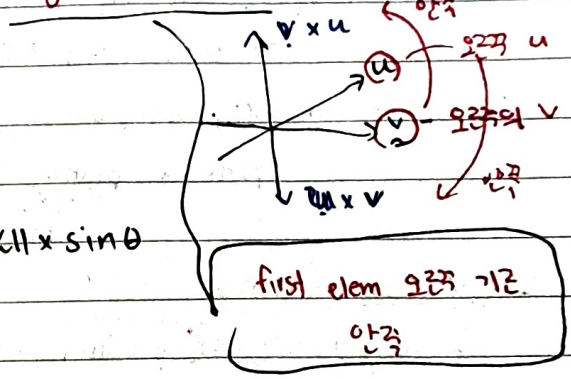
Cross Product in $\mathbb{R}^3$

$$\underset{\sim}{u} \times \underset{\sim}{v} = \begin{matrix} u_2 & u_3 & u_1 & u_2 \\ v_2 & \times v_3 & \times v_1 & \times v_2 \end{matrix}$$

$$[u_2v_3 - v_2u_3, \cdots]$$

- $\underset{\sim}{u} \times \underset{\sim}{u} = \underset{\sim}{0}$
- $\underset{\sim}{u} \times \underset{\sim}{v} = -\underset{\sim}{v} \times \underset{\sim}{u}$
- $\underset{\sim}{u}, \underset{\sim}{v}$ are $\perp$ to $\underset{\sim}{u} \times \underset{\sim}{v}$, $\underset{\sim}{v} \times \underset{\sim}{u}$
- $\underset{\sim}{u} \times (\underset{\sim}{v} + \underset{\sim}{w}) = \underset{\sim}{u} \times \underset{\sim}{v} + \underset{\sim}{u} \times \underset{\sim}{w}$
- $c\underset{\sim}{u} \times \underset{\sim}{w} = c(\underset{\sim}{u} \times \underset{\sim}{w}) = \underset{\sim}{u} \times c\underset{\sim}{w}$

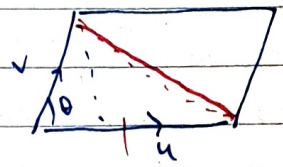
- Right-hand rule



first elem 양수 기준

ABCD's Area

Area of Parallelogram $= \|\underset{\sim}{u} \times \underset{\sim}{v}\| = \|\underset{\sim}{u}\| \times \|\underset{\sim}{v}\| \times \sin\theta$



Area $\Delta = \frac{1}{2}\|u \times v\|$

General Form

$ax + by = c$

normal form

$\underset{\sim}{n} \cdot \underset{\sim}{x} = d$ ← Given a point, $\underset{\sim}{n} \cdot (\underset{\sim}{x} - \underset{\sim}{p}) = 0$

expand to get form $\underset{\sim}{n} \cdot \underset{\sim}{x} = d$

perpendicular to slope

Vector form a Parameterized equaams

$$\left.\begin{aligned} \underset{\sim}{x} &= \underset{\sim}{p} + \underset{\sim}{d}t \\ x &= p_1 + d_1 t \\ y &= p_2 + d_2 t \end{aligned}\right\} \quad t \in \mathbb{R}$$