Mo Tu We Th Fr Sa Su

Memo No. _____

Date / /

# Review the Topics of Unit 1 2025.1.16

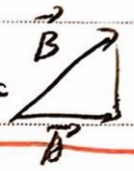
① vectors. dot product

$\vec{A}\cdot\vec{B} = |\vec{A}|\cdot|\vec{B}|\cdot\cos\theta = \sum a_i b_i$

↳ find angles, detect ⊥

② Cross-product

$$\vec{A}\times\vec{B} = \begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{vmatrix}$$

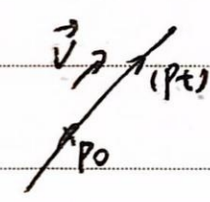
Application: area of  $= \frac{1}{2}|\vec{A}\times\vec{B}|$

Normal vector to a plane $\vec{N}$

③ equation of a plane

$ax+by+cz=d$, $\vec{N} = \langle a, b, c\rangle$ $a(x-x_0)+b(y-y_0)+c(z-z_0)=0$

→ equation of lines, where lines intersects plane




$P(t) = P_0 + t\cdot\vec{v}$

④ Matrices, Liner systems, Inverting matrices

$AX=B$, $X = B\cdot A^{-1}$, $\det(A)=0$ no sol or ∞ many solutions

↑ $AX=B$

⑤ parametric function $x(t)$, $x(\theta)$

the Cycloid $\langle a\theta - a\sin\theta, a - a\cos\theta\rangle$

Velocity and Acceleration, tagent vector

speed $= |\vec{v}| = |\vec{r}'|$ $T = \frac{\vec{v}}{|\vec{v}|}$ $(\vec{R})' = \vec{v}$ $|\vec{v}|' = \vec{A}$