

2D

10/2/14-1

Homot

→

CART

$(1, 2, 3)$

→

$(\frac{1}{3}, \frac{2}{3}, 1)$

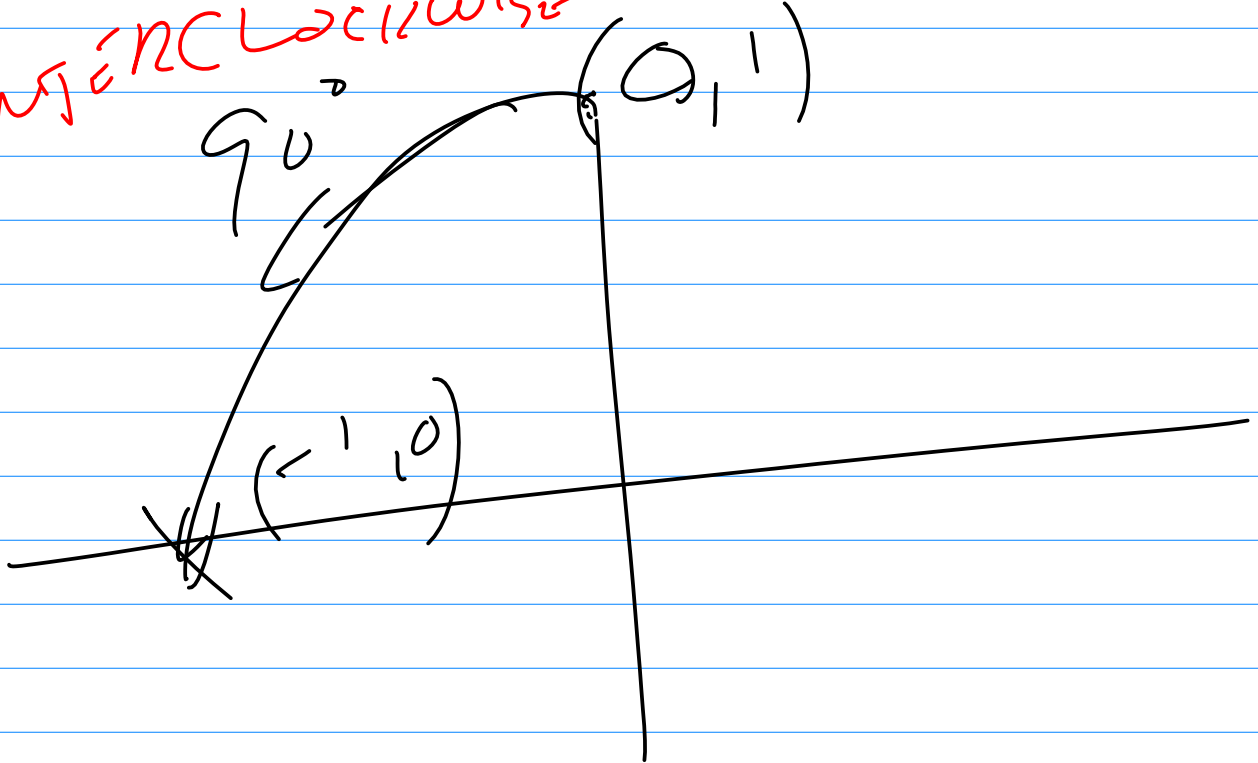
TRANS BY $(1, 2)$

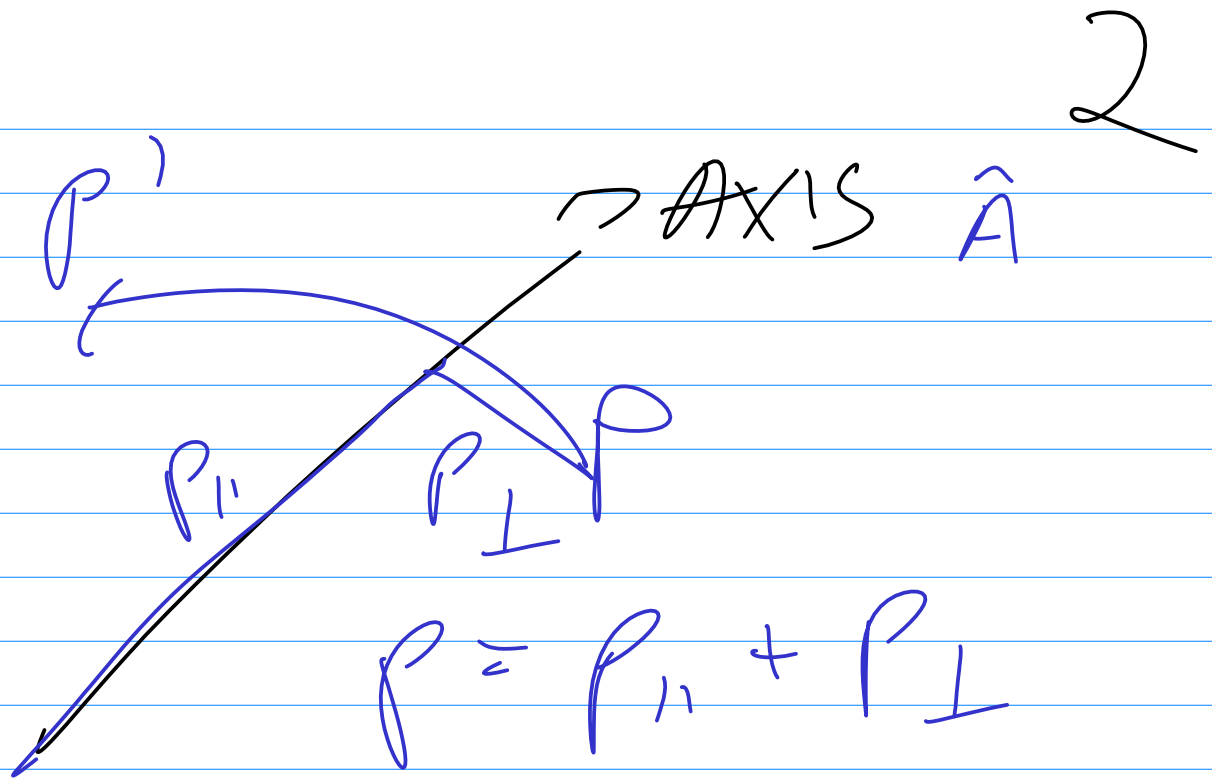
$(4, 8, 3)$

←

$(\frac{4}{3}, \frac{8}{3}, 3)$

COUNTERCLOCKWISE

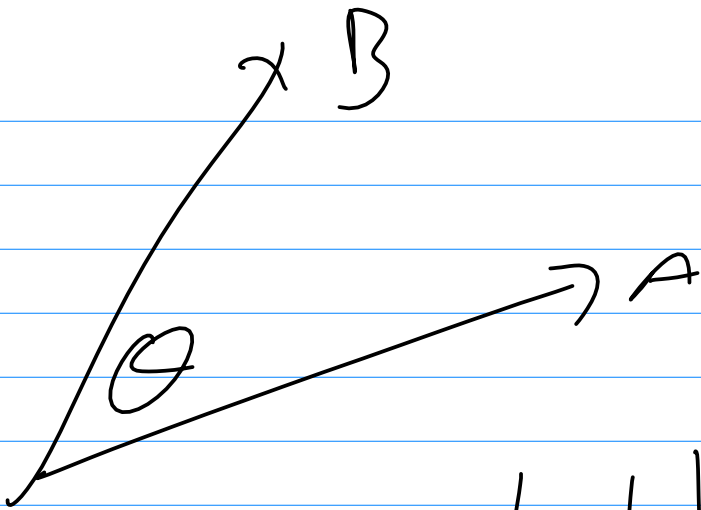




$$P_{||} = A \cdot P A$$

$$P_{\perp} = P - P_{||}$$

3



$$\underline{A \cdot B = |A| |B| \cos \theta}$$

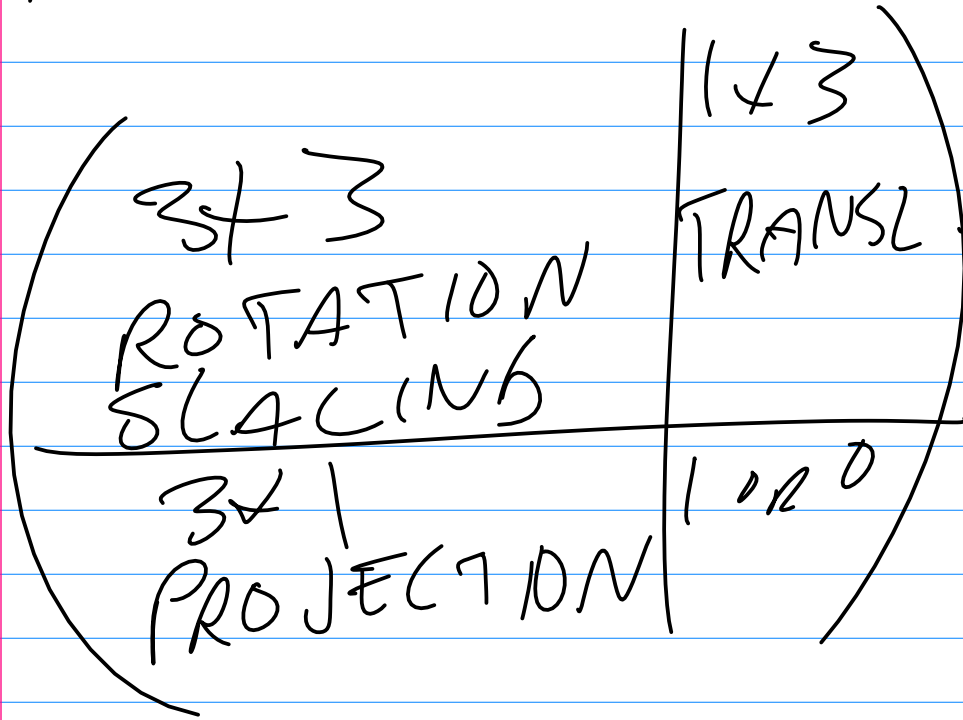
$$\begin{pmatrix} 2 & 0 & 0 & 2 \\ 0 & 2 & 0 & 2 \\ 0 & 0 & 2 & 4 \\ 0 & 0 & 0 & 2 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 3 \\ 4 \\ 2 \end{pmatrix} \rightarrow \begin{pmatrix} 1 \\ 1\frac{1}{2} \\ 2 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 3/2 \\ 0 & 0 & 1 & 2 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

EQUIVALENT

4

4/24 HOMOS

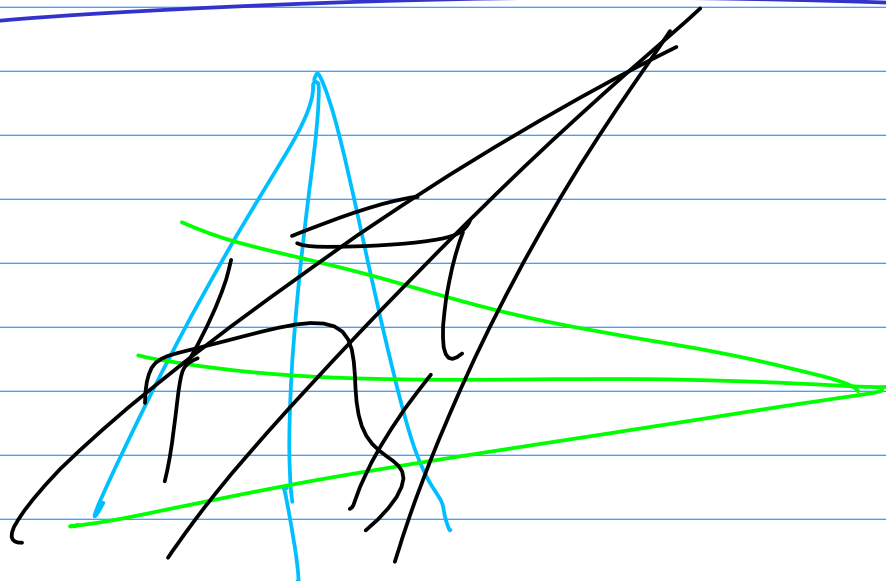
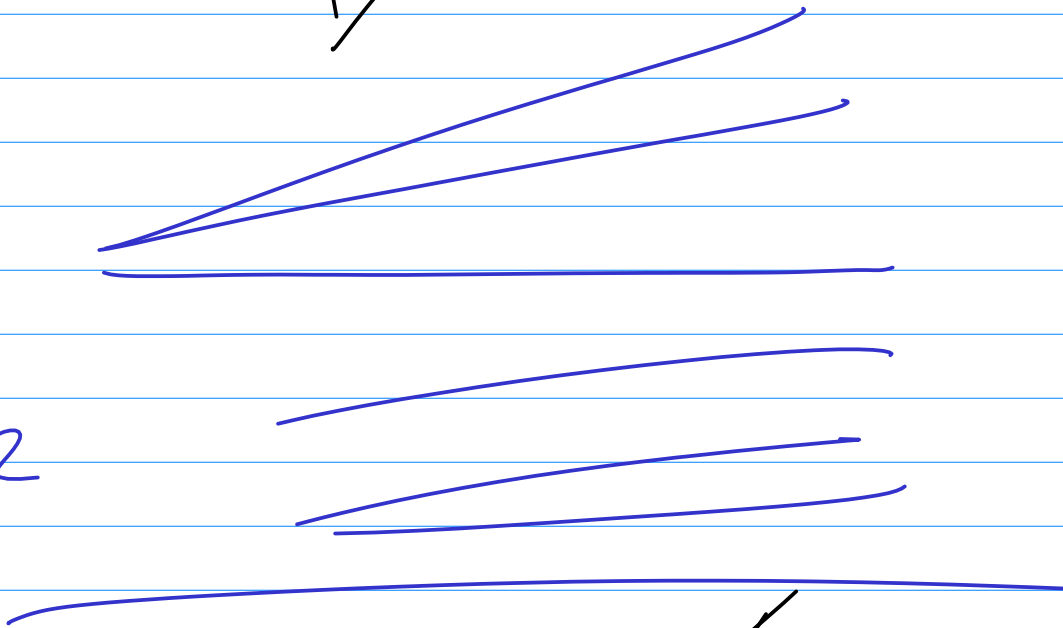


PROJECTION SURFACE

5



or



PARALLEL LINES CONVERGE IN HOMOGENEOUS COORDS



CART $x=1$ HOM $x-w=0$
 CART $x=2$ HOM $x-2w=0$

CHECK $(2,0) \rightarrow (2,0,1)$
 $(2,1,1)$ $(2,2,1) \in \mathbb{P}^2$

WHERE DO $x-w=0$

INTERSECT $x-2w=0$

AT POINT $(0,1,0)$

7

WHAT DOES POINT

2th HOON $(0, 1, 0)$

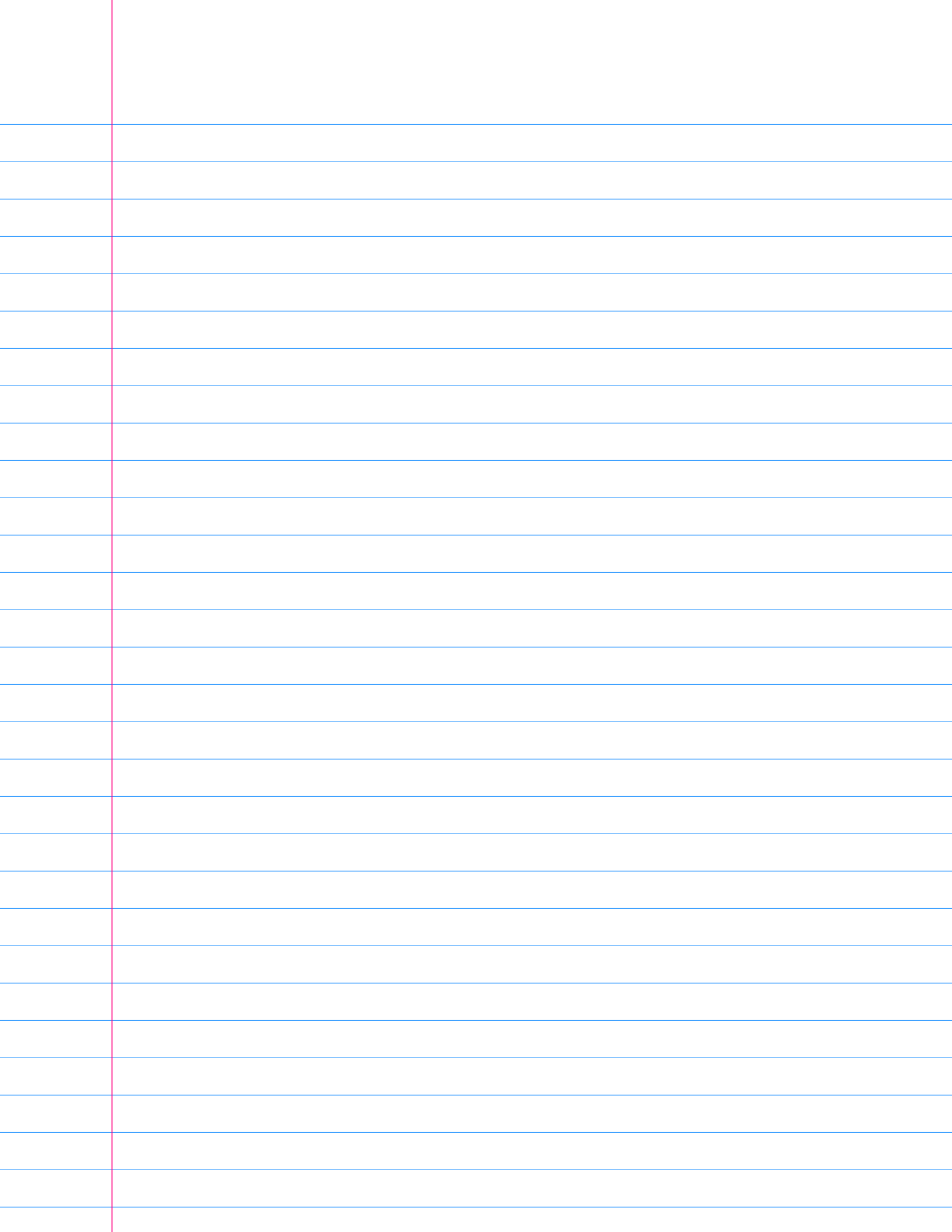
MEAN

IT'S THE LIMIT OF

$(0, 1, 1)$, $(0, 2, 1)$, $(0, 10, 1)$, $(0, 100, 1)$
 $(0, 1, \frac{1}{2})$ \rightarrow ∞



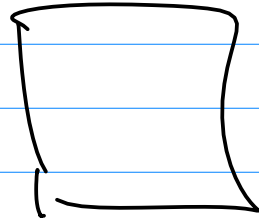




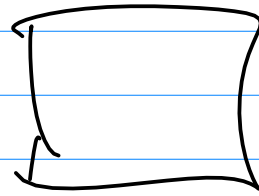
PUZZLES

10

TOP VIEW



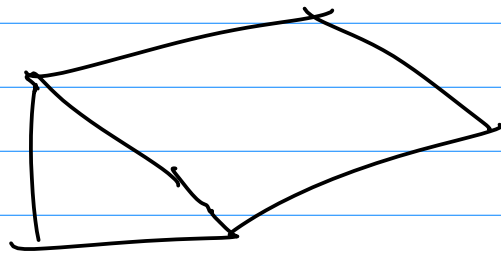
FRONT VIEW



WHAT'S OBJECT?

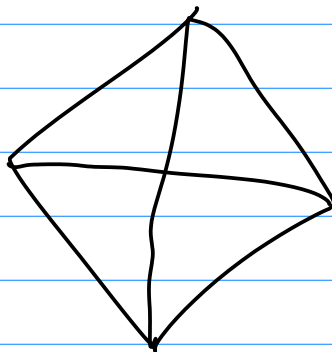
TRANSPARENT, YOU CAN SEE
ALL EDGES. FLAT FACES

A1 CUBE



Q2

TOP + FRONT



VIEW NORMALIZATION

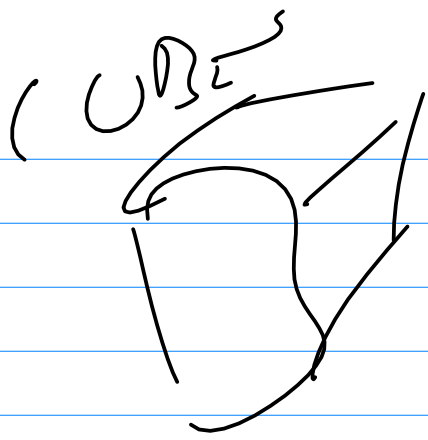
DEFAULT PROJECTION

$$(X, Y, Z) \rightarrow (X, Y, 0)$$

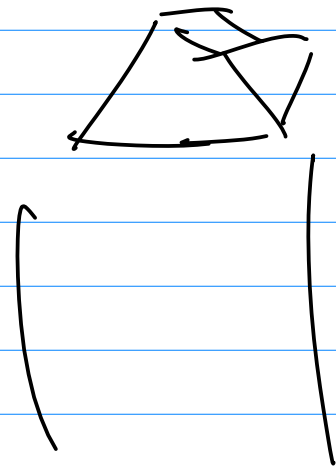
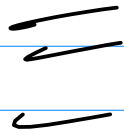
$$\text{CLIP BOX } -1 \leq X \leq 1 \\ -1 \leq Y \leq 1$$

IF UNCONVENIENT VIEWER
WANTS ANOTHER PROJECTION
THEN WE TRANSFORM WHOLE
SCENE SO WE CAN USE
DEFAULT.

+ GET SAME RESULT!



DISTORTED 12



(x, y, z)



TRİ D=7

- $(x, y, z) \rightarrow (\frac{7x}{2}, \frac{7y}{2}, 7)$
- $(10, 10, 10) \rightarrow (7, 7, 7)$
- $(10, 20, 30) \rightarrow (\frac{7}{3}, \frac{14}{3}, 7)$

$$\left(\begin{array}{c|c} 10 & \\ \hline 10 & \\ \hline 10 & \\ \hline 20 & \\ \hline 30 & \end{array} \right)$$

$$\left(\begin{array}{c} 7 \\ 7 \\ 7 \end{array} \right)$$

$$\left(\begin{array}{cccc} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 \end{array} \right)$$

$$\left(\begin{array}{c} 10 \\ 20 \\ 30 \\ 30 \end{array} \right)$$

$$\left(\begin{array}{c|c} 10 & \\ \hline 10 & \\ \hline 10 & \\ \hline 1 & \end{array} \right)$$

$$\left(\begin{array}{c} 13 \\ 10 \\ 20 \\ 30 \\ 1 \end{array} \right)$$

$$\left(\begin{array}{c} 7/3 \\ 14/3 \\ 7 \end{array} \right)$$