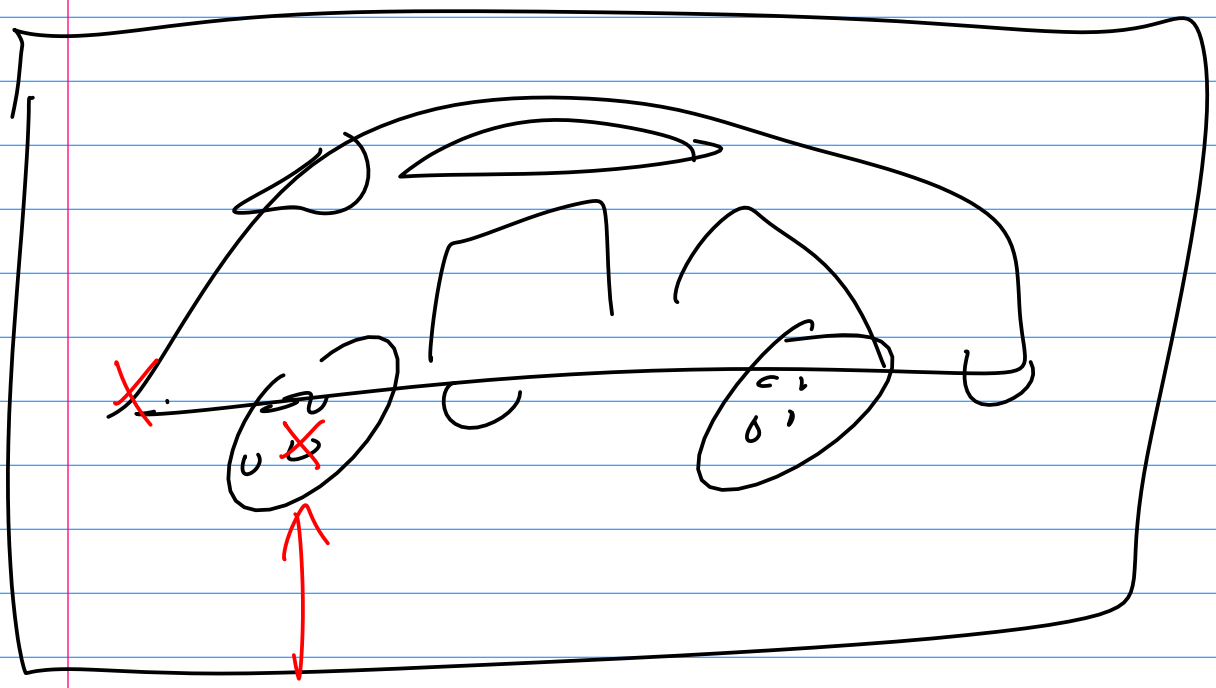
CS 10/16/17 p1



WHAT INFO TO RETURN TO USER?

$$\begin{pmatrix} 50 \\ 70 \\ 90 \\ 10 \end{pmatrix} \begin{pmatrix} 10 \\ 14 \\ 18 \\ 2 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 4 \\ 5 \\ 6 \\ 1 \end{pmatrix} \begin{pmatrix} 40 \\ 50 \\ 60 \\ 10 \end{pmatrix} \begin{pmatrix} 8 \\ 10 \\ 12 \\ 2 \end{pmatrix}$$

TESTON

$$\begin{pmatrix} 4 \\ 5 \\ 6 \end{pmatrix} \rightarrow \begin{pmatrix} 5 \\ 7 \\ 9 \end{pmatrix}$$

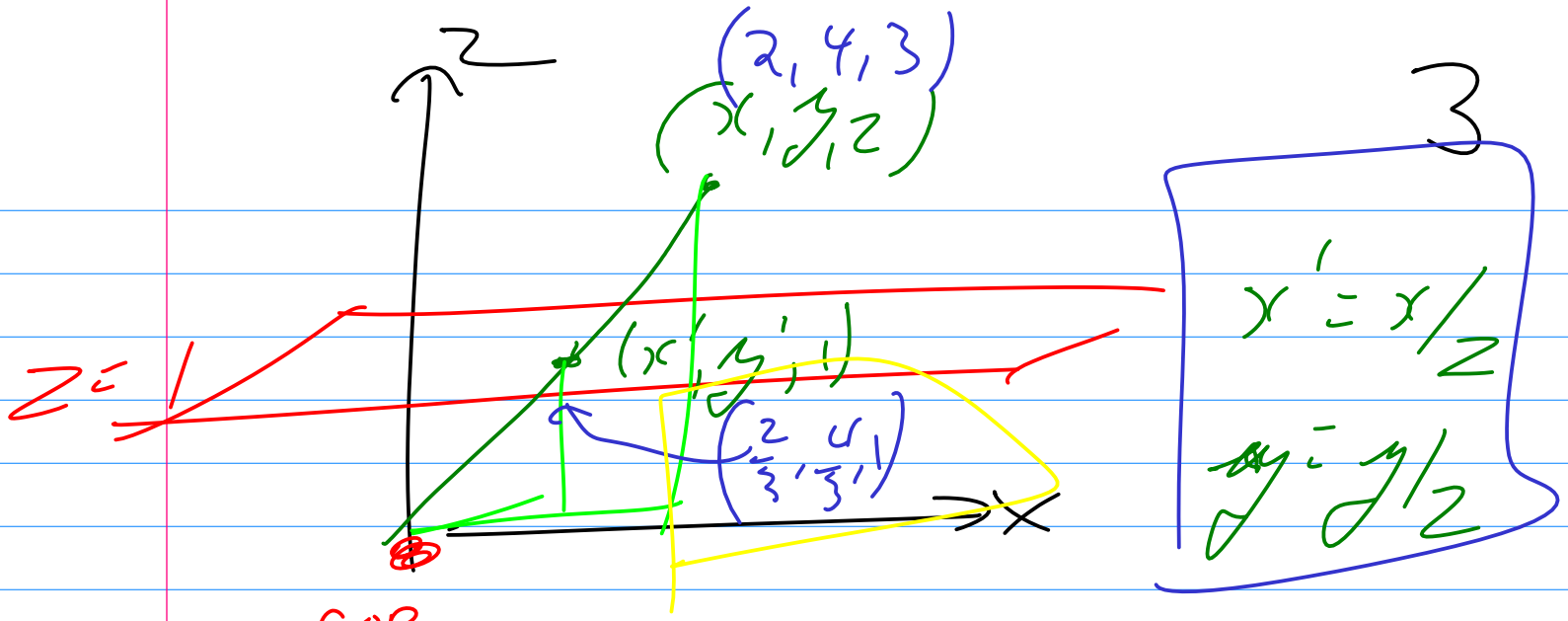
$$\begin{pmatrix} 30 \\ 42 \\ 54 \\ 6 \end{pmatrix} = \begin{pmatrix} 2 & 0 & 0 & 2 \\ 6 & 2 & 0 & 4 \\ 0 & 0 & 2 & 6 \\ 6 & 0 & 0 & 2 \end{pmatrix} \begin{pmatrix} 12 \\ 14 \\ 18 \\ 3 \end{pmatrix}$$

2

$$\begin{pmatrix} -2 \\ 4 \\ 6 \\ 2 \end{pmatrix} = \begin{pmatrix} .6 & -.8 & 0 & 0 \\ .8 & .6 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 4 \\ 6 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix} = \begin{pmatrix} .6 & -.8 & 0 \\ .8 & .6 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

$$\begin{pmatrix} -1 \\ 2 \\ 3 \end{pmatrix}$$



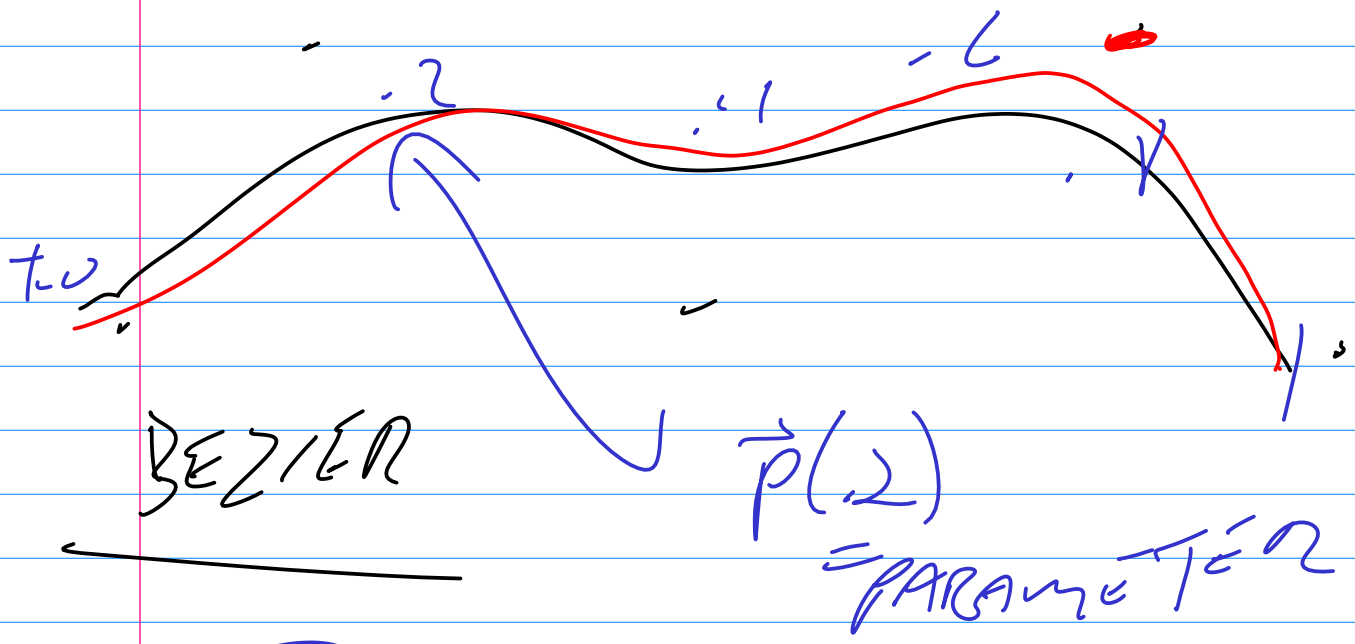
COP

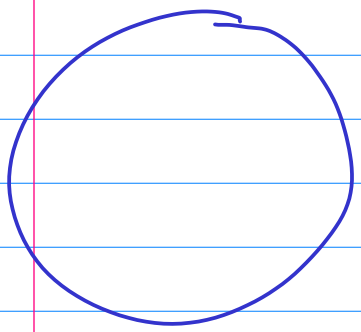
$$\begin{pmatrix} 10 \\ 20 \\ 15 \\ 15 \end{pmatrix} = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} 10 \\ 20 \\ 15 \\ 15 \end{pmatrix}$$

$$\begin{pmatrix} 10/15 \\ 20/15 \\ 15/15 \end{pmatrix} = \begin{pmatrix} 2/3 \\ 4/3 \\ 1 \end{pmatrix}$$

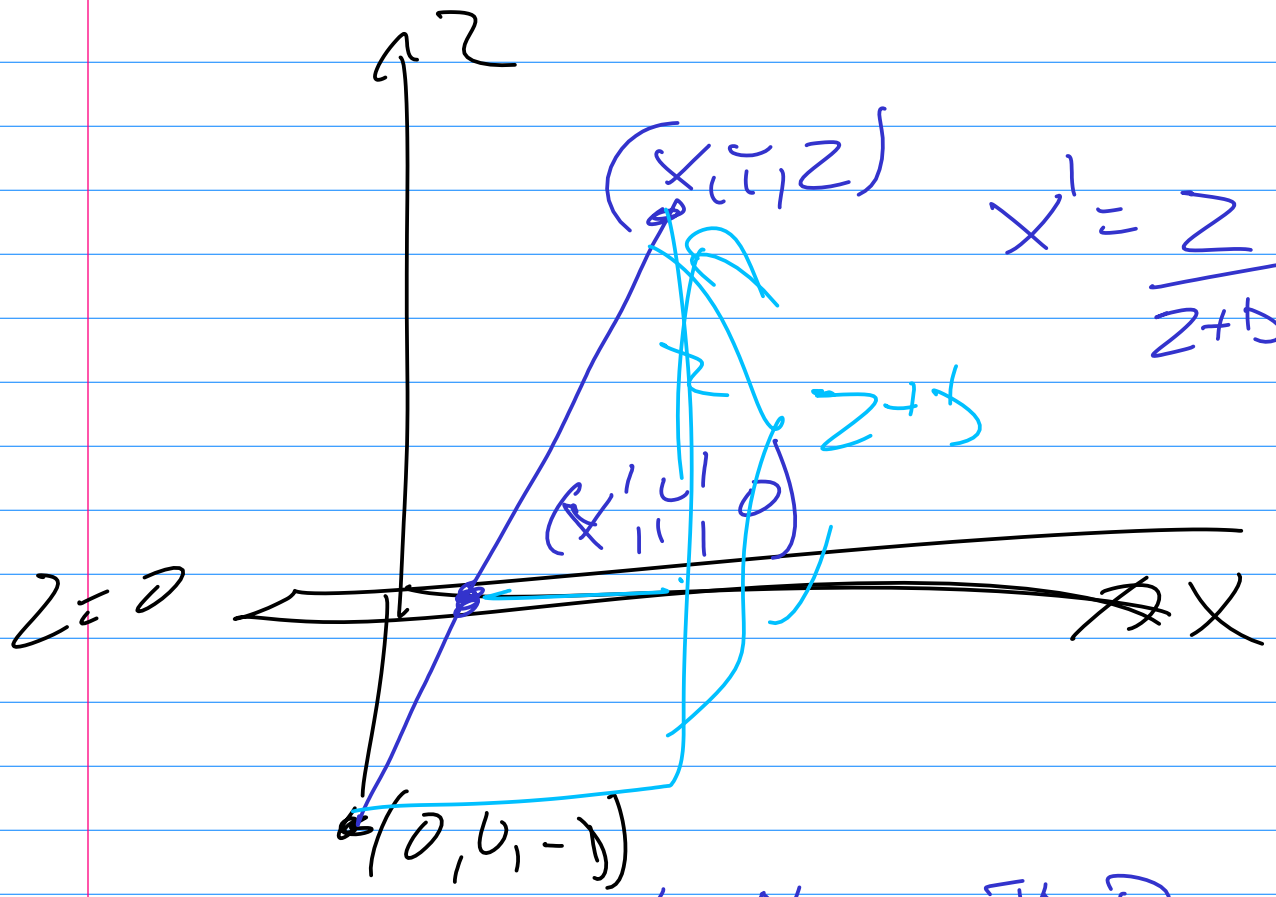
$$\begin{matrix} 2 \\ 4 \\ 3 \end{matrix} \quad \begin{matrix} 10 \\ 20 \\ 15 \end{matrix}$$

4

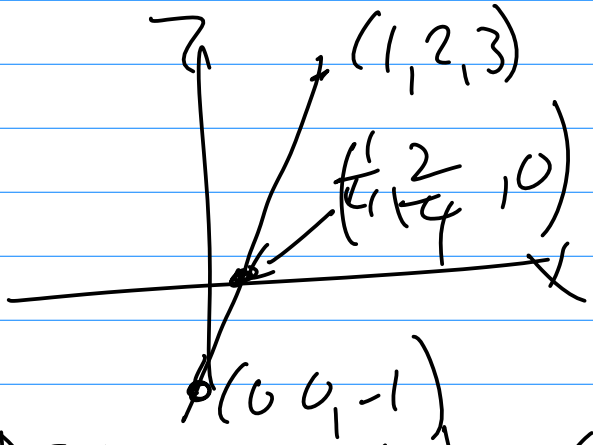




PERSPECTIVE PROJ, CTD



z+d SCALES DOWN TO 0



$x' = \frac{1}{z+1} x$

$y' = \frac{1}{z+1} y$

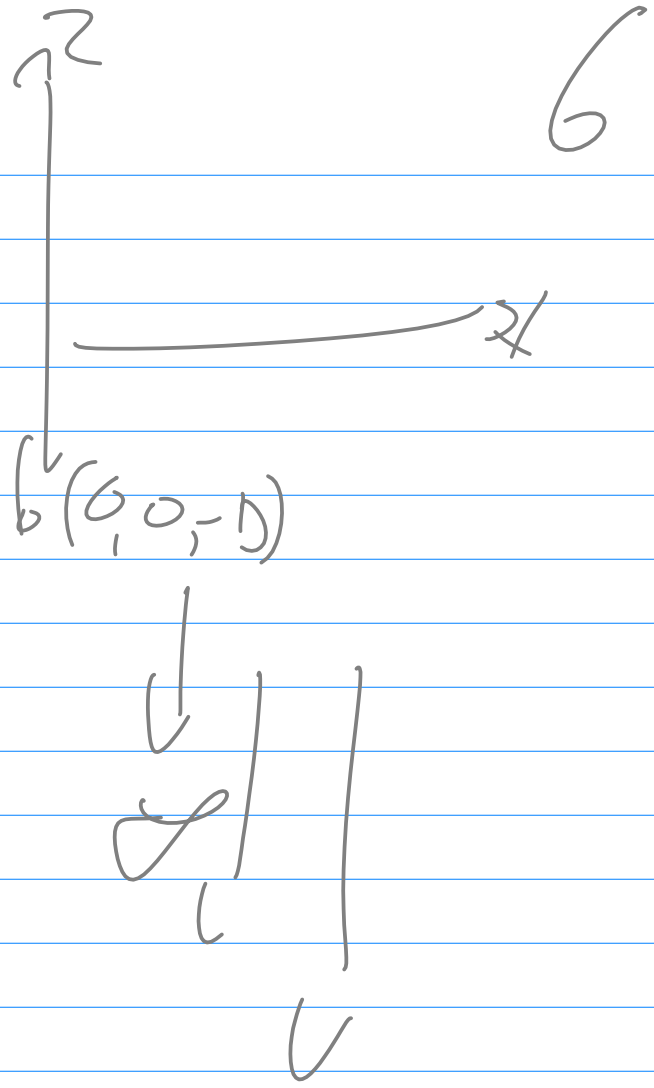
$d = 1$

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

✓

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{D} & 1 \end{pmatrix}$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$



PARALLEL PROJECTION

$x' := x$

$y' := y$

$z' := 0$