1

a) axtbytc =0

 $\chi^T = (\chi y 1) I = (abc)^T$

Inner product: $x^{T}I = (x y 1) \begin{pmatrix} a \\ b \end{pmatrix} = axtbytc = 0$

b) I = (a b c) T I' = (a' b' (') T

The intersection point x are on both lines

 $\Rightarrow \chi^T L = 0$ and $\chi^T I' = 0$

 $x = I \times I'$ is orthogonal to both I & I'

=> 2 is on both lines

i. X=IxI'

c) Let $\chi = \begin{pmatrix} \chi_1 \\ \eta_1 \end{pmatrix}$ and $\chi' = \begin{pmatrix} \chi_2 \\ \eta_2 \end{pmatrix}$

they represent the line passing through both points $T = X \times X'$

I = (a,b,c), so Any point P which is on the line can satisfy PII = 0. => Homogeneous Coordinates

i I = xxx"

d) y = ax + (1-a) x/

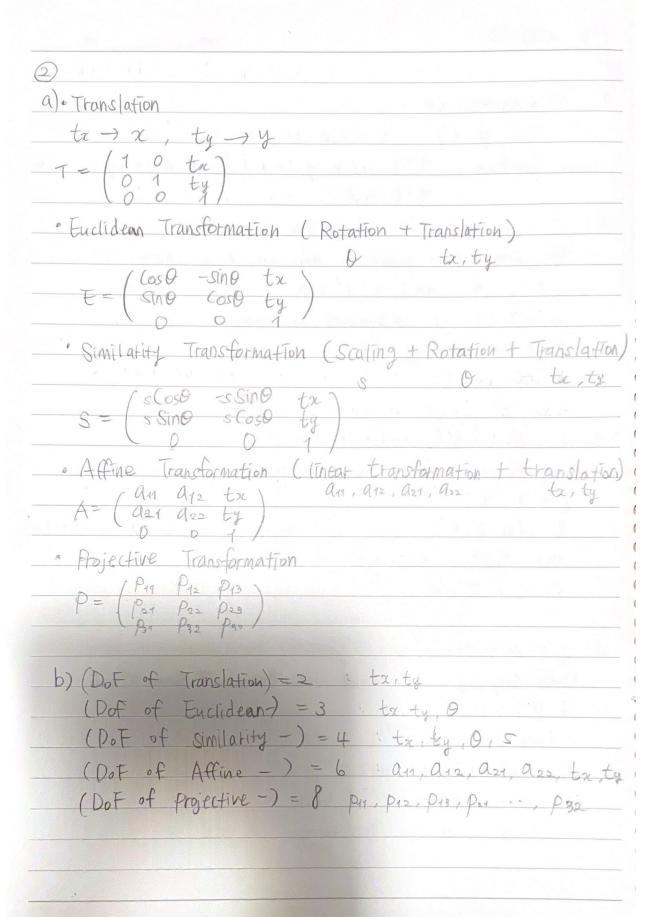
Let's say y is on the line through x and x'

 $= (\alpha x + (1 - \alpha) x')^{T} I = \alpha x^{T} I + (1 - \alpha) x'^{T} I$

from () ITI =0 and X'TI =0

· XXTI+(1-x)x"I=0

=) y is on the line through oc and oc'



	DATE,
c) A projective transformation	is represented by 3x3 matrix
with 9 elements, but	the num of Pot is only 8.
It's because of Homog	geneous Coordinates. It means
only ratios of the M	nattix elements matter.
4	e to the scaling factor.
o) (Acti	
3	
a) 2'= Hx	
	C = 0 , m man man man man man man man man man m
	k if X is on the line I,
	n the line I'.
$T'T_{X'} = 0$ $O' = H$	20
	Charles and pure at many of
=> (I'TH) 2 =0	
$\exists T'TH = T'$	
$\exists I' = (H^{-T})I$	
H-T means the invet	5e of H.
[I1 7/21) (I2 7/2)	
b) I = (I, 22) (I, 21)	
(1, 2) (12 21)	
· Transformation of In	es and points
T/=H-TI1, I'a	$=H^{-T}I_2$
Zi= HZ, Z'=	HX2
- Invariant Calculation	
$T' = (T_1' T_2(1) (T_2' X_2')$	
$I' = \frac{(I_1')(I_1)(I_2)(I_2')}{(I_1')(I_2')(I_2')}$	
(1/2/(12/1)	-Tr a/ 11m ~ ~/ 11m
I'=H,11' To=H	TI2, 21= HZ1, X2= HZ2

 $I_{1}^{T}\chi_{1}' = (H^{-T}I_{1})^{T}(H\chi_{1}) = \chi_{1}^{T}H^{-1}H^{-1}I_{1}$ $=\chi_{1}^{T}(H^{-T})^{T}H^{-1}I_{1}=I_{1}^{T}\chi_{1}$ ISTX= = (H-TI2)T(HX2) = ITX2 $I_1^T \chi_2 = (H^{-1}I_1)^T (H\chi_2) = I_1^T \chi_2$ $I_{2}^{T}\chi_{1}^{\prime}=(H^{-T}I_{2})^{T}(H\chi_{1})=I_{2}^{T}\chi_{1}$ $T' = (I_1 \chi_1)(I_2 \chi_2) = T$ (IIX2) (IIX1) . I is invariant. · Why fewer points or lines don't work? We need to compare several elements for meaningful invariant. Using only one pair of points or lines doesn't provide enough information to ensure invariance. It cannot be easily normalized.