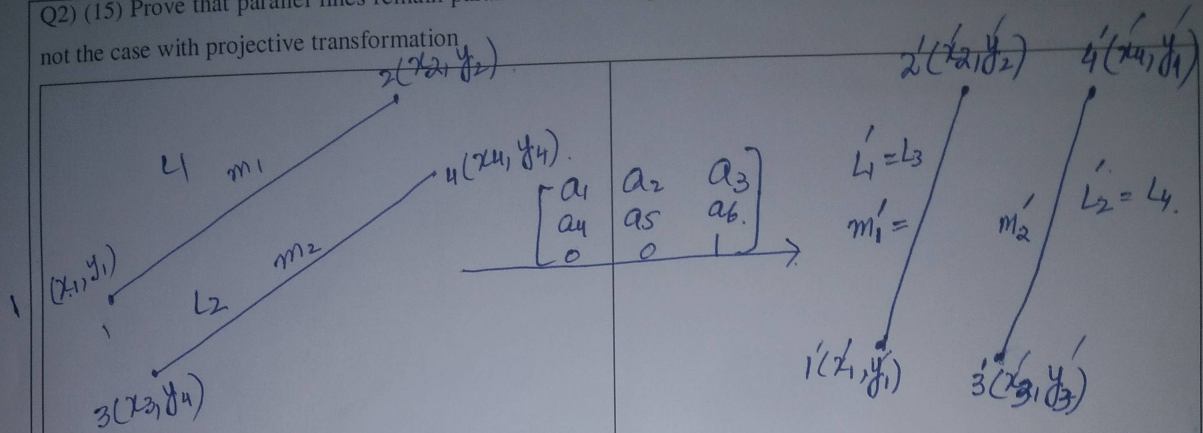


Q2) (15) Prove that parallel lines remain parallel after undergoing any 2D affine transformation. Show that this is not the case with projective transformation.



Given $m_1 = m_2 \Rightarrow \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{(y_4 - y_3)}{(x_4 - x_3)} \quad \text{--- (1)}$

To Prove $m'_1 = m'_2 \Rightarrow \frac{(y'_2 - y'_1)}{(x'_2 - x'_1)} = \frac{(y'_4 - y'_3)}{(x'_4 - x'_3)} \quad \text{--- (2)}$

$$\begin{matrix} x'_1 \\ y'_1 \end{matrix} \rightarrow \begin{bmatrix} a_1 x_1 + a_2 y_1 + a_3 \\ a_4 x_1 + a_5 y_1 + a_6 \\ 1 \end{bmatrix} = \begin{bmatrix} a_1 & a_2 & a_3 \\ a_4 & a_5 & a_6 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ y_1 \\ 1 \end{bmatrix}$$

Put values of $x'_1, y'_1, x'_2, y'_2, x'_3, y'_3, x'_4, y'_4$ in Eq. (2)