

# QUIZ L4 Q1

$$P \begin{pmatrix} -10 \\ 2 \\ 5 \end{pmatrix}$$

$$U \begin{pmatrix} 0 \\ -1 \\ 0 \end{pmatrix} V \begin{pmatrix} 0 \\ 0 \\ -1 \end{pmatrix} n \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$$

$$a \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix} b \begin{pmatrix} 0 \\ 0 \\ -1 \end{pmatrix} c \begin{pmatrix} 0 \\ 1 \\ 0 \end{pmatrix}$$

$$a \cdot b = c$$

$$a \cdot b = a \cdot c = b \cdot c = 0$$

$$T_P^{-1} R^{-1} R^{-1} T_P^{-1}$$

with abc

$$\begin{pmatrix} 100-10 \\ 0102 \\ 0015 \\ 0001 \end{pmatrix} \begin{pmatrix} 0 & 0 & 1 & 0 \\ -1 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & -1 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & 0 & 10 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & -5 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

# QUIZ L4

Perform the rotation  $\theta$  around point  $C \begin{pmatrix} 1 \\ 1 \end{pmatrix}$  of point  $P \begin{pmatrix} 2 \\ 2 \end{pmatrix}$

$$\theta = 45^\circ$$

$$Q = \text{MP}$$

$$Q1 = \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \sqrt{2}/2 & -\sqrt{2}/2 & 0 \\ \sqrt{2}/2 & \sqrt{2}/2 & 0 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 1 & 0 & -1 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{pmatrix}$$

$$= \begin{pmatrix} 1 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} \sqrt{2}/2 & -\sqrt{2}/2 & 0 \\ \sqrt{2}/2 & \sqrt{2}/2 & -\sqrt{2} \\ 0 & 0 & 1 \end{pmatrix} = \begin{pmatrix} \sqrt{2}/2 & -\sqrt{2}/2 & 1 \\ \sqrt{2}/2 & \sqrt{2}/2 & 1-\sqrt{2} \\ 0 & 0 & 1 \end{pmatrix}$$

$$Q = \text{MP} = \begin{pmatrix} \sqrt{2}/2 & -\sqrt{2}/2 & 1 \\ \sqrt{2}/2 & \sqrt{2}/2 & 1-\sqrt{2} \\ 0 & 0 & 1 \end{pmatrix} \begin{pmatrix} 2 \\ 2 \\ 1 \end{pmatrix} = \begin{pmatrix} 1 \\ 1+\sqrt{2} \\ 1 \end{pmatrix}$$