Step-1

Given that $A=\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$ and $M=\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

So, $M^{-1}=\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$

$$M^{-1}AM=\begin{bmatrix} \cos\theta & \sin\theta & 0 \\ -\sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$=\begin{bmatrix} a\cos\theta+d\sin\theta & b\cos\theta+e\sin\theta & c\cos\theta+f\sin\theta \\ -a\sin\theta+d\cos\theta & -b\sin\theta+e\cos\theta & -c\sin\theta+f\cos\theta \\ g & h & i \end{bmatrix}\begin{bmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

The element (3,1) in this product is $g\cos\theta+h\sin\theta$ is given to be zero.

$\Rightarrow g\cos\theta+h\sin\theta=0$

$\Rightarrow h\sin\theta=-g\cos\theta$

$\Rightarrow \tan\theta=\frac{-g}{h}$

$\Rightarrow \theta=\tan^{-1}\left(\frac{-g}{h}\right)$