Step-1

We need to choose the value of *, so that the matrix R = PA will be triangular.*

Consider

$$
\begin{aligned}
R &= PA \\
&= \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix} \begin{bmatrix} 1 & -1 \\ 3 & 5 \end{bmatrix} \\
&= \begin{bmatrix} \cos\theta - 3\sin\theta & -\cos\theta - 5\sin\theta \\ \sin\theta + 3\cos\theta & -\sin\theta + 5\cos\theta \end{bmatrix}
\end{aligned}
$$

Step-2

Since, R has to be triangular, we want $\sin\theta + 3\cos\theta = 0$.

Consider

$$
\begin{aligned}
\sin\theta + 3\cos\theta &= 0 \\
\sin\theta &= -3\cos\theta \\
\tan\theta &= -3 \\
\theta &= \tan^{-1}(-3)
\end{aligned}
$$

This gives $\theta = -71.565°$.

Step-3

We have

$$
\begin{aligned}
\sin(-71.565°) &= -0.9487 \\
\cos(-71.565°) &= 0.3162
\end{aligned}
$$

Step-4

Therefore, when $\sin(-71.565°) = -0.9487$ *and* $\cos(-71.565°) = 0.3162$*, the matrix R = PA is triangular.*