Step-1

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

Consider

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

Step-2

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

Consider

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

This gives $\theta = -71.565°$.

Step-3

We have

$$\sin(-71.565°) = -0.9487$$
$$\cos(-71.565°) = 0.3162$$

Step-4

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