Consider the rotation matrix:

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

where $\cos\theta \neq 0$.

(1) Find the inverse of R via direct calculation.

(2) Find R^T and verify $R^T = R^{-1}$.