Exercise 3.2.2

If Q is orthogonal, then $\det(Q) = \pm 1$.

Answer

We know $Q^t = Q^{-1}$ and $\det(Q^t) = det(Q)$.

$$\begin{gathered}
\det(I) = 1 \\
\det(QQ^{-1}) = 1 \\
\det(Q)\det(Q^{-1}) = 1 \\
\det(Q)\det(Q^t) = 1 \\
(\det(Q))^2 = 1 \\
\det(Q) = \pm 1
\end{gathered}$$