1 Given $x' = \Lambda x$ and $x' \cdot y' = x \cdot y$ show:

a $\Lambda^T g \Lambda = g$ $\quad g_{\alpha\beta} = \Lambda^\mu{}_\alpha \, g_{\mu\nu} \, \Lambda^\nu{}_\beta$

b $(\det \Lambda)^2 = 1$

c $(\Lambda^0{}_0)^2 = 1 + \sum_k (\Lambda^k{}_0)^2 \geq 1$

2 Complete the table on page 159 of the lecture notes, obtaining the results that were not explictly shown in the notes.