

$$*) \quad W \Gamma Z = \begin{pmatrix} I_r & 0 \\ 0 & 0 \end{pmatrix}, \quad I_r = n \times n \text{ identity matrix for some } r.$$

c) ~~If~~ W, Z are invertible matrices, show the converse: $\exists X$, then $\Gamma Q \Gamma = \Gamma$, some Q (p.s.).