6.3.7

Let $A = \begin{pmatrix} 0 & 1 \\ 0 & 0 \end{pmatrix}$ and $x \xmapsto{T} Ax$

then $N(T) \neq N(T^*)$

6.3.12.a

$x \in R(T^*)^\perp$ iff $\langle x, T^* y \rangle = 0 \quad \forall y \in V$

iff $\langle Tx, y \rangle = 0 \quad \forall y \in V$

iff $\|Tx\|^2 = 0$

iff $Tx = 0$

iff $x \in N(T)$

6.4.1.g F let $\mathbb{F} = \mathbb{R}$

let $A = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$ and $x \xmapsto{T} Ax$

then T is normal but is not diagonalizable.